WORD STRUCTURE AND VOCABULARY ACQUISITION: THEORY AND APPLICATION TO MANDARIN CHINESE AS A SECOND/FOREIGN LANGUAGE

By

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Zhaohui Cheng

To my grandmother and mother

献给不识字却养育了我的祖母
及
母亲的在天之灵

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NOMENCLATURE

AAM	The Augmented Addressed Morphology Model
ACT	The Adaptive Control of Thought
CFL	Chinese as a foreign language
CSL	Chinese as a second language
ESL	English as a second language
L1	the first language
L2	the second language
SLA	Second Language Acquisition

Abstract of Dissertation Presented to the Graduate School
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Theories of Second Language Acquisition proclaim that appropriate instruction and strategy training facilitate and accelerate the process of second language acquisition. Psycholinguistic studies have found that morphological structure, which is part of the mental lexicon, plays a role in word learning and is related directly to vocabulary learning and reading achievement. Chinese is a language written in morphemic characters, and its words are mostly compounds. The purpose of this work is to present an appropriate pedagogy to teach L2 (second language) learners Chinese words. First, a series of investigations which contained surveys, tests and interviews was completed. It was found that native Chinese speakers usually can adopt the knowledge of character radicals and word structure to get the meanings of unfamiliar words in their L1 easily and effectively, but L2 learners of Chinese cannot. This indicates that L2 learners need knowledge related

to Chinese word structure and character radicals and also training in proper strategies. In order to guide L2 learners to study new words more effectively, the general rules of Chinese words and word structure are analyzed and presented as the second part of this work. Finally, a systematic vocabulary pedagogy is discussed and presented on the basis of the study results in previous parts: at the elementary Chinese level, teach L2 learners core words, basic character radicals and the knowledge of character structure; meanwhile, train them to use the knowledge of character structure and radicals to recognize and memorize words; at the intermediate level, teach learners the knowledge of word structure and related rules, train them to use such knowledge and contextual information to learn new words by themselves; at the advanced level, teach L2 learners lower-frequency words and lexical phrases, and at the same time, train students to use different strategies properly to learn a large number of words and to produce words in a native-like way by sufficient language interactions.

CHAPTER 1
INTRODUCTION

1.1 Purpose of Research

The subject of this dissertation is the acquisition and pedagogy of vocabulary in Chinese as a second/foreign language (CSL/CFL). Vocabulary acquisition is one of the most important tasks in the learning of a language. In the past twenty years, vocabulary acquisition and teaching is the area which has developed fastest in the research of Second Language Acquisition (SLA). However, in the studies of CSL/CFL, this topic has not caught as much attention as it has in the acquisition study of other languages. In order to narrow the gap, this research will study the properties of Chinese word structure and their roles in vocabulary recognition for both native speakers and foreigners, and will, as a result, propose a possible teaching pedagogy of Chinese words from the beginning to the advanced level. The suggested vocabulary pedagogy will help learners acquire and develop their vocabulary more easily and more quickly. Moreover, this research will contribute to our knowledge of vocabulary acquisition in SLA in general.

1.2 Problems of Vocabulary Acquisition

1.2.1 Studies of Lexical Acquisition in Second Language Acquisition

Vocabulary knowledge is the ability to understand and to use a word automatically for communicative purposes. The vocabulary knowledge of a natural language speaker is

in fact one indicator of his/her proficiency level. For example, the knowledge of an advanced level speaker of English should consist of over 7,000 lexical items (Laufer 1992). Coady (1997) claims that for understanding advanced and authentic academic texts, an L2 learner of English should have "good knowledge of at least 5,000 words, in addition to significant reading skill" (p. 287). The knowledge of an advanced level speaker of Chinese is over 8,000 words (*Han-yu Shui-ping Deng-ji Da-gang* 汉语水平等级大纲 'The Criteria of Chinese Proficiency Levels' 1988). The size of such vocabularies is obviously much smaller than that of a native speaker. According to recent research, the average size of an English vocabulary that a native speaking university student knows and potentially uses is more than 50,000 words (Aitchison 1996, p.16). "It has been said that learning a second language means learning its vocabulary" (Gass, 1999, p. 325). From the beginning level all the way up, vocabulary development is one of the most strenuous tasks of foreign language learners. Laufer points out:

> Recent findings point to the fact that lexical problems might be even more important than those in phonology and syntax... Moreover, learners themselves often claim that lexis is their greatest difficulty in L2. Any experienced teacher knows that even after students have mastered grammar, they still face masses of unknown words. (Laufer 1986, p.131)

Studies on reading in SLA also show that vocabulary forms the most basic building blocks underlying the reading process. "It has never been empirically demonstrated, nor is it theoretically expected, that some instructional innovation could result in good reading comprehension without the presence of at least adequate word recognition ability"(Stanovich 1991, p. 418). The vocabulary problem, however, was largely ignored in the study of SLA until the 1980s. Partly because of the overwhelming concentration on

syntactic structure, vocabulary did not have a separate identity for a long time and was just treated as a subject within the study of reading or writing. As observed by Coady (1997), on the one hand, students feel that words are very important and are eager to learn them; on the other hand, teachers and scholars feel that teaching vocabulary is a low-level intellectual activity, and that words are going to be learned naturally from reading and do not need to be taught. Thus, scholars have not seen the need for vocabulary teaching in spite of the students' requests for it.

Vocabulary acquisition began to attract attention in the 1980s and has become the fastest growing area of second language education in terms of research output and publications at present. The studies, mainly focusing on English as a second/foreign language, include the following: a) what vocabulary knowledge is, b) the strategies learners use to acquire vocabulary, and c) vocabulary teaching.

In second/foreign language education, vocabulary knowledge is defined as "a continuum between ability to make sense of a word and ability to activate the word automatically for productive purposes" (Faerch, Haastrup & Phillipson 1984, p.100). It contains **potential vocabulary**, which "learners have not come across before" (Palmberg 1987, p.201) but can be understood when encountered, and **active vocabulary**, the words that learners have learned and can understand or use. Nation (1990) developed a list of the various types of vocabulary knowledge:

1. The spoken form of a word.
2. The written form of a word.
3. The grammatical behavior of the word.
4. The collocational behavior of the word.
5. How frequent the word is.
6. The stylistic register constraints of a word.
7. The conceptual meaning of a word.

8. The associations a word has with other related words.

When a learner has mastered all these types of knowledge, s/he is able to use a word in a native-like and fluent manner. The studies of vocabulary knowledge have made it clear what learners should master in order to use a word and what the study of vocabulary teaching and acquisition should focus on. The results of these studies have laid the groundwork for the theoretical formulation of further vocabulary acquisition research.

Vocabulary learning processes and strategies is an area where a great deal has been harvested. The research consists of several experimental studies on lexical acquisition in a second language (L2). The following learning strategies have been found effective: extensive reading, lexical inference, structure study and word associations.

Extensive reading is endorsed by many studies (e.g. Clarke & Nation 1980, Carnine et al. 1984, Krashen 1989, Grabe & Stoller 1997) to improve learners' vocabulary knowledge. It is claimed that words can be acquired "incidentally" from extensive reading, and the reasons are:

> (a) It is contextualized, giving the learner a richer sense of a word's use and meaning than can be provided in traditional paired-associate exercises, (b) it is pedagogically efficient in that it enables two activities---vocabulary acquisition and reading---to occur at the same time, and (c) it is more individualized and learner-based because the vocabulary being acquired is dependent on the learner's own selection of reading materials. (Huckin and Coady 1999, p. 182)

All these studies, however, were based on the way L1 (the first language) learners acquire their vocabulary. Many other studies also find that extensive reading does not automatically lead to the acquisition of vocabulary, and there is no clear way to show that a word has been learned incidentally. Paribakht and Wesche (1999) note that vocabulary

acquisition "is in some fundamental sense not 'incidental'" (p. 215). It much depends on the context surrounding each word, the nature of the learner's attention, the task demands, and other factors (Huckin and Coady 1999). Moreover, increasing vocabulary through extensive reading takes much time and practice and might not be very effective in intensive L2 learning. It is also hard to ask L2 learners at low language levels to do extensive reading. "In spite of the evident role of reading in much advanced vocabulary acquisition, it is also apparent from both research and experience that the process is slow, often misguided, and seemingly haphazard, with differential outcomes for different learners, word types, and contexts" (Paribakht and Wesche 1999, p. 197).

Other researchers, like Scherfer (1993), Bensoussan (1992), Hulstijn (1992), and Fraser (1999), have found that guessing the meanings of words from context, particularly in reading, results in a high rate of vocabulary memory and acquisition. At present, lexical inference has been strongly suggested in L2 vocabulary development. Nevertheless, as some scholars point out, lexical inference will not be successful if a context contains many unknown words or cannot offer enough hints to infer the meaning of a word. Moreover, "it requires a great deal of prior training in basic vocabulary, word recognition, metacognition, and subject matter" (Huckin and Coady 1999, p. 190). Therefore, lexical inference is limited in many language contexts and cannot be used all by itself.

Through tests, interviews and self-reports, Sanaoui (1995) found that learners who engaged in independent study and self-initiated learning activities of recording, reviewing and practicing lexical items outside their L2 course were more successful in vocabulary acquisition. He suggests that vocabulary study should be structured. Moreover, Schmitt & Meara (1997) claim that word associations (i.e. the links that connect or relate words in

some manner in a person's mind) and verbal suffixes are related to a learner's vocabulary size and can also help the learner acquire vocabulary.

The progress in vocabulary learning is the most focused area in the research of vocabulary acquisition. Studies (e.g. Paribakht & Wesche 1997, Zimmerman 1997) have concluded that "although vocabulary learning certainly does take place through the presumed ordinary contextual approach, such learning can indeed be improved by adding formal instruction"(Coady 1997, p. 287). Several books on the subject were published in the 1980s and 1990s, e.g., Working with Words (Gairns & Redman 1986), Vocabulary: Applied Linguistic Perspectives (Carter 1987), Vocabulary and Language Teaching (Carter & McCarthy 1988), and Teaching and Learning Vocabulary (Nation 1990). The discussions include the aim of vocabulary teaching, items to be presented, and teaching techniques. The main purpose of vocabulary teaching is to train and help students to derive and produce meanings from lexical items both by themselves and out of the classroom (Carter 1987). Core words and high-frequency words are suggested to be taught first (Carter 1987, chapter 7; Coady 1997). The teaching techniques presented are mainly the following:

1. Keyword Imagination: (1) to teach target language words through sound associations with the native language, (2) to associate a new word with an imagined picture, or (3) to teach a word with semantic or functional relations (e.g. to learn the word 'food' with related ones like 'meat', 'vegetable', 'knife and fork', 'bowl', 'table and chair', 'kitchen', etc.) (Gairns & Redman 1986; Hulstijn 1997).

2. Context Technique: to teach words in typical contexts (Hulstijn 1992, 1997; Scherfer 1993).
3. Communication: to teach vocabulary through different communicative activities (Nation 1990; Nation & Newton 1997)

Meanwhile, some course materials and dictionaries reflecting the above ideas have been designed and presented to learners as tools and guides. Examples are: Vocabulary (Morgan & Rinvolucri 1986), Words and Their Meaning (Jackson 1988), Longman Dictionary of Contemporary English (1989).

Although vocabulary has gained status as an important component of second language acquisition, and a number of steps have been taken in its study, there is still a long way to go. The system of vocabulary acquisition rules has not been established, and vocabulary teaching is not as systematized as the techniques of teaching phonology and syntax. While courses on reading, writing, grammar, speaking and listening are common in L2 programs, there are very few vocabulary courses. We still lack operational comprehensive models for various areas of vocabulary that "allow us to systematize and synthesize all the knowledge we have gained so far about vocabulary" (Maiguashca 1993, p.94). Materials of vocabulary teaching that teachers could use in various educational contexts are also urgently needed. Moreover, the studies of vocabulary acquisition and teaching are limited mainly to the area of English as a Second Language (ESL). "All the current work is based on Indo-European languages, despite the fact that cognate vocabularies seem relatively easy to learn and that non-Indo-European languages are known to cause special problems in the area of vocabulary acquisition"(Meara 1996, p.37).

1.2.2 Studies in Chinese Vocabulary Acquisition

The study of teaching and learning Chinese as a second/foreign language is very young. Despite a lot of interesting work in grammar, speaking, listening, writing and culture, vocabulary acquisition in CSL/CFL has received scant research attention. The studies of Chinese word acquisition, compared with the increasing amount of work in English word acquisition, are very few and superficial. No experimental studies have been conducted. On the other hand, studies have found that vocabulary is the main difficulty of all CFL learners at different levels, and it is also the main problem in all the learning processes of Chinese speaking, listening, reading and writing (Gao, Li & Guo 1993). Studies on reading in CFL also indicate that word identification undoubtedly facilitates the ability of reading Chinese. Because of the challenging nature of Chinese vocabulary and the lack of necessary Chinese word knowledge, it is difficult for CFL learners to identify and isolate units of meaning, to build up Chinese character networks, and to demonstrate intratextual perceptions (i.e. how different parts of a text are integrated into a coherent discourse structure) in Chinese reading; thus, the development of Chinese reading proficiency is seriously hindered (Everson & Ke 1997, Li 1997). However, Chinese word study is still limited to the morphological area, and the discussions are focused on the linguistic description of Chinese words, such as the definition of a 'word', word categories and grammatical functions, the historical development of Chinese words and analysis of word structure. The only major achievement in vocabulary pedagogy is the statistics of basic and frequently used words in Modern Chinese. It has been found that 3,000 frequently-used words cover 86.7% of reading materials (Wang 1986). Among them, 1645 are compounds (Wang 1994). It has been accepted that these high-frequency words

have to be taught first in CSL/CFL. Beside this research, only a few studies have discussed some pedagogical techniques in vocabulary teaching, and the following techniques are suggested:

1. **Comparative and Contrastive Technique**: to compare and contrast the meanings and functions of synonyms (Huang, X. 1993; Huang, B. 1997).
2. **Key Word Imagination**: to image a picture and situation where a key word can describe or be used, or to link a key word with other related words to form a network (Zhang 1990; Huang, Z. 1994; Lin 1997).
3. **Context Technique**: to teach words in sentences and contexts (Zhang 1990; Zhu 1993; Huang, X. 1993).
4. **Word Structure**: to list together the words with the same morpheme, or to analyze word structure in order to help learners distinguish similar words (Zhang 1990; Liu 1997).

Such studies are highly limited in both scope and quantity. There is no thorough study and discussion of how vocabulary pedagogy can be applied systematically in the classroom from the beginning to the advanced level. There is no investigation or analysis of how learners learn, store and produce Chinese words. Moreover, no learning strategies used by learners of CSL/CFL are reported or discussed. Vocabulary is also rarely considered as an important component in course-books. In most Chinese textbooks currently used, there are only vocabulary lists of Chinese words and their English (or French, Japanese) glosses, and very few exercises are especially designed for vocabulary. In short, there is a vast unexplored area in vocabulary acquisition of CSL/CFL, and numerous interesting topics have not been explored.

1.3 Design of Research

1.3.1 Properties of Chinese Words

Chinese is usually regarded as a language difficult for Western learners. From its phonology and syntax to the writing system, Chinese is very different from western languages. It is true that many features of Chinese, such as the tones and the writing system which are not directly related to the pronunciation of a word, are difficult for L2 learners of Chinese; but some other features, such as its word composition and character structure, can very well be utilized to make it easier to learn the language.

In modern Chinese, most words are compounds. These words are formed by combining two or three monosyllabic morphemes together. Each morpheme, in the Chinese writing system, is by and large written as a character. Mostly, the meaning of a compound can be derived from the meanings of its morphemes or characters. The total number of Chinese characters is truly huge, but commonly used ones are much fewer. About 3,800 common characters can cover 99.9% of Chinese reading materials (Zhang 1992, p.69). In *Xian-dai Han-yu Chang-yong-zi Biao* 现代汉语常用字表 (A List of Common Characters in Modern Chinese) (1987), 2,500 characters are listed as the most-frequently used and the most needed characters which can comprise 97.97% of Chinese reading materials; another 1,000 characters with lower frequencies comprise 1.51% of reading materials; and all the other characters are rarely used and only comprise 0.52% of Chinese reading materials. As a result, only 3000-4000 characters are used to produce words which comprise 99.64%-99.9% of general reading materials. Moreover, Chinese characters have another useful feature: each character generally contains one or,

in rarer cases, more meaningful components which are traditionally termed "radicals". Historically, the total number of radicals has varied greatly, from 214 to 540, depending on the method of identification. The most minute division of components in recent studies counts such radicals between 430-475, but only 70-94 of them are the basic and the most common ones which are used in more than 70% of all the characters (Huang 1996, Fei 1996). The facts that a limited number of characters can be combined into an enormous Chinese vocabulary and that a limited number of radicals can derive thousands of characters certainly constitute a tremendous advantage to vocabulary acquisition for CFL/CSL learners as well as for native speakers. Unfortunately, this has not been taken advantage of in Chinese vocabulary pedagogy. To fill the virtual void, this research is designed to study the structures of Chinese words and characters and their roles in vocabulary recognition of both native speakers and foreigners. From this perspective, several experimental studies of Chinese word recognition and acquisition were designed to form an important part of this study. Moreover, in order to provide the rules of Chinese word structure to vocabulary pedagogy and to help foreign learners acquire vocabulary, much of this study is devoted to an analysis of Chinese words. At the end of this research, a possible teaching pedagogy from the beginning to the advanced level is suggested to help learners develop their vocabulary more easily and more quickly.

1.3.2 Organization of the Dissertation

This study contains nine chapters. Following this introduction, Chapter two briefly reviews the related theories of SLA and psycholinguistics which can be expected to contribute to vocabulary pedagogy. Studies in SLA have concluded that well-organized classroom instruction and carefully-designed learning strategies can help L2 learners

acquire a language effectively. This suggests that vocabulary acquisition can also be improved through formal education and strategy training. Morphological and psycholinguistic studies have found that words are regularly structured in every language, and that morphemes figure prominently in the lexical recognition process of native speakers to help them understand, memorize and learn derived words. This means that morphemes and word structure should also play an important role in vocabulary acquisition and pedagogy.

Psychological studies have also found that morphemes and word structure are used in the recognition of familiar words by native Chinese speakers. It is not clear, however, if this knowledge is also adopted to guess at unfamiliar ones. Furthermore, it is also unknown how important and helpful the knowledge of word structure is in the process of deriving the meaning of a new word, or whether it plays a role in learning a new word. To answer these questions, the methods used by Chinese native speakers and CFL learners to understand and acquire Chinese words are investigated, compared and analyzed. Their reports are presented in Chapters Three and Four. These two chapters consist of surveys, tests, interviews and analysis of results. The results show that word structures and character radicals as well as contexts form a very important part of information that native speakers can rely on to infer the meaning of a word. Such information makes it possible for native speakers to understand an unfamiliar word easily and fast. L2 learners of Chinese at different language levels, however, lack the ability to use this kind of information if they are not trained for it. The results suggest that radicals and word structure are a very important part of Chinese language, and they should be taught as a part of the linguistic skills in Chinese instruction.

Chapters Five and Six are the analyses of Chinese word structure, including the description of previous studies, the main structure types of Chinese words, and the relationships between the meanings of a word and its components. In Chapter Seven, a cognitive analysis of common measure words (classifiers) and localizers is provided. The goal of these chapters is to find general rules of word structure and patterns that can be used to help L2 learners of Chinese understand and acquire vocabulary effectively.

Chinese vocabulary pedagogy is discussed in Chapter Eight. Based on the investigations and word studies of this research, it is suggested that effective vocabulary-learning strategies and the general rules of word structure should be taught in Chinese vocabulary pedagogy. The knowledge of common character radicals/components, basic grammar and a certain amount of 'core' words, i.e. the monosyllabic words and compounds with high-frequency of occurrence in the language, should be taught to learners at the beginning level. Character-decomposition and radical-grouping can be used as teaching techniques to help learners memorize basic vocabulary. At the intermediate level, the rules of word structure should be systematically introduced before learners induce any piecemeal knowledge by themselves. At the advanced level, the main task of Chinese vocabulary teaching is to transform learners' potential vocabulary into an active one through extended reading, writing and other ways of communication.

The ninth chapter is the conclusion of the entire work. The results of this research are summarized in this chapter.

CHAPTER 2
VOCABULARY ACQUISITION AND RELATED THEORIES

2.1 Theories in Second Language Acquisition

Second language acquisition is a very complex process. It involves many internal and external factors relative to learners. Despite many theories discussing different models and factors, there is not a theory that directly addresses vocabulary acquisition in second/foreign languages, which is an important part of the complex process. Vocabulary acquisition in SLA has only been incidentally treated in some theories. This chapter will therefore review such incidental treatments together with other related issues in those theories.

2.1.1 Theories of Language Classroom Instruction

Foreign language learning typically depends on formal classroom instruction. The process of classroom instruction includes the design of a syllabus, tasks, language input, classroom interaction and language production. While some researchers advocate language to be acquired in natural language environments by exposing the learner to comprehensible language data, many studies have presented sufficient evidence to show that formal instruction contributes greatly to second/foreign language acquisition. By reviewing the literature on formal instruction, Long (1983) concludes that, in general, instruction is advantageous for children as well as for adults and for both intermediate and advanced learners in acquisition-rich as well as acquisition-poor environments, and that

instruction appears to result in faster learning and higher levels of proficiency. Ellis also summarizes that "formal instruction helps learners (both foreign and second) to develop greater L2 proficiency, particularly if it is linked with opportunities for natural exposure"(Ellis 1994, p.616). Several studies of morpheme acquisition (e.g. Perkins and Larsen-Freeman 1979, Pavesi 1986) likewise show that formal instruction results in increased accuracy and accelerates progress through developmental sequences, even though no difference of acquisition orders was found between instructed and naturalistic learners. Nevertheless, there are also limitations to formal instruction. Several hypotheses below proclaim that formal instruction only works when it matches learners' stage of development and focuses learners' attention on both forms and meanings in the context of communicative activities.

The Interface Hypothesis: Instruction facilitates acquisition by supplying learners with conscious rules and providing practice to enable them to convert the controlled knowledge into automatic knowledge (Sharwood-Smith 1981).

The Variability Hypothesis: Instruction of new structures will affect learners' careful style (i.e. the language forms are consciously attended to and monitored) but not their vernacular style (i.e. the language forms are used spontaneously and easily in communication) (Ellis 1987).

The Teachability Hypothesis: Instruction can promote language acquisition if the interlanguage is close to the point when the structure to be taught is acquired in the natural setting (Pienemann 1985).

The Selective Attention Hypothesis: Formal instruction acts as an aid to acquisition by providing learners with points of access and focusing their attention (Lightbown 1985).

All these hypotheses indicate that instruction, which matches the learner's learning stage and style, speeds up the acquisition process by helping them pay selective attention to form and form-meaning connections in language input, and by providing them language rules and practice. There is sufficient evidence that formal instruction works when it is extensive, comprehensible, clearly related to a specific function, well-designed and within the learner's current interlanguage (Ellis 1994, Chapter 14). Even though such studies and theories address problems of acquisition in general terms only, they may be easily extended to vocabulary acquisition and instruction. In other words, the process of L2 vocabulary acquisition may hopefully be accelerated through classroom instruction when the instruction is well-designed, just as the acquisition of sentence structure is. Conceivably, well-designed vocabulary instruction should 1) present learners with modified input knowledge to match the stage of acquisition process, 2) focus learners' attention on word rules that learners cannot derive easily through natural language exposure, 3) train learners in effective learning strategies, and 4) provide learners with more opportunities for vocabulary interaction and practice. Studies on native speakers find that vocabulary instruction appears to have an effect on comprehension (Stahl and Fairbanks 1986). If so, then direct vocabulary instruction would naturally be more beneficial to and necessary for L2 learning than L1 learning. This is so because L2 learners have less natural and incidental exposure to their target language and they cannot acquire the mass of vocabulary they need by the limited amount of language data they are

provided in meaningful reading, listening, speaking and writing. In fact, at least one study has found that systematic instruction can indeed result in L2 students learning certain target words, and it suggests that the most effective way of addressing the vocabulary needs of L2 students is through a combination of reading and interactive vocabulary instruction (Zimmerman 1994).

2.1.2 Theories of Learning Strategies

Language learning strategies are mental and behavioural actions or techniques used by learners to make language learning more successful. They include memorization, contextualization and inferencing. It has been reported that learning strategies are very important in the success of SLA, and different learning strategies contribute to different aspects of L2 proficiency (Ellis 1994, Chapter 12).

There are three major types of strategies: 1) cognitive strategies, including direct analysis, transformation or synthesis of learning materials; 2) metacognitive strategies, i.e. learning a language by means of planning, monitoring and evaluation; and 3) social/affective strategies, which concerns "the ways in which learners elect to interact with other learners and native speakers" (Ellis 1994, p.538). It has been found that language learners are generally aware of and can identify the strategies they use if they are asked to pay attention to what they do. Strategy choice is affected by individual differences, the learner's personal background and situational or social factors. Successful learners appear to use learning strategies more frequently, flexibly and appropriately. They pay attention to both form and meaning and search for meaning in the L2 data they are exposed to. Good learners treat the target language as a system by making effective comparisons, analyzing and using reference, and they also treat teachers as 'informants' by

showing more active involvement in language learning (Pickett 1978). Research on language learning strategies holds considerable promise for language pedagogy. It is believed that "learning will be facilitated if students are explicitly trained to become more aware of and proficient in the use of a broad range of strategies that can be utilized throughout the language learning process" (Cohen 1998, p.66). Strategy training in language instruction can improve both the learning skills and the language skills of students. It is claimed that strategy training provides students with the necessary tools to: 1) self-diagnose their strengths and weaknesses in language learning; 2) become more aware of what helps them to learn the language they are studying most efficiently; 3) develop a broad range of problem-solving skills; 4) experiment with both familiar and unfamiliar learning strategies; 5) decide how to approach a language task; 6) monitor and self-evaluate their performance; and 7) transfer successful strategies to new learning contexts (Weaver and Cohen 1998). Therefore, strategy training can enhance students' efforts to reach language program goals because it encourages students to find their own pathways to success, and thus it promotes learners' autonomy and self-direction.

Research on vocabulary acquisition is in fact the study of learning strategies. It investigates strategies of different types, analyzes the effective elements in vocabulary acquisition, and seeks effective ways to use learning techniques in the process of vocabulary learning. As Ellis remarks, strategy "is particularly useful in vocabulary acquisition" (1994, p.556), and it is crucial to teach students strategies for learning vocabulary. A number of scholars have argued that as there is a lot of individual variation among learners; therefore, teaching them vocabulary learning strategies is even more crucial (Oxford and Scarcella 1994, Sanaoui 1995, Coady 1997, Parry 1997). L2 learners

usually cannot acquire the mass of vocabulary they need only from their language class and other teaching materials. Thus, they should be taught how to continue to improve their vocabulary on their own by teaching them appropriate vocabulary learning strategies. "The development of extensive vocabulary knowledge for advanced literacy purposes requires some direct instruction and strategy training, as well as extensive exposure to the language (usually through reading)" (Coady 1997, p. 277). The first problems in vocabulary teaching can be reduced to the locating of strategies and the choosing among them. Since successful learners generally pay attention to both form and meaning and treat a target language as a system, regular rules for both the form and meaning of a word should be analyzed and introduced into the strategies of vocabulary learning. Moreover, the learning styles of learners from different cultures and backgrounds should be taken into account in planning the strategies.

2.2 Theories in Psycholinguistic Studies

2.2.1 Morphological Structure and Mental Lexicon

Mental lexicon is the mental dictionary of a "vast compendium of information about words and their relationships that you carry about in your head" (Kess 1992, p. 80). In this sense, word recognition is not instantaneous. In the view of some psycholinguists, there are three stages in word recognition: prelexical process, lexical access, and postlexical process.

> **Prelexical processes** analyze a written or spoken input, identifying it as a particular word. **Lexical access** activates semantic, phonological, orthographic, and other information associated with the lexical item. **Postlexical processes** select, elaborate on, and integrate lexical information in order to comprehend sentences and discourse. (Taylor 1990, p. 174)

From the 1970s to 90s, one typical research question of psycholinguists interested in the lexicon was whether or not morphological structure plays a role in the processing of language comprehension and production. In the 1970s, two hypotheses were proposed for lexical representation: the Whole-Word Hypothesis, which maintains that there is an independent lexical representation for each word of the language, and no morphological structure is encoded at the level of lexical representation of words; and the Full Decomposed Representation Hypothesis, which assumes that morphemic units consisting of roots, derivational affixes and inflectional affixes are independently represented in lexical representations, or only those morphologically complex forms of inflectional affixes are represented. There is evidence against both hypotheses. On the one hand, there are a large number of polymorphemic words in the lexicon of numerous languages in the world, and language users can coin and understand novel polymorphemic words without any noticeable difficulty. This indicates that the morphological dimension of language is not a linguistic accident but serves an important purpose in language use. There are at least two problems that the Whole-word Hypothesis cannot solve: the morphological system allows users to recognize new forms, and it also allows for the rejection of "illegal" forms. On the other hand, the Fully Decomposed Representation hypothesis also has problems, e.g. it cannot explain the irregular inflectional affixes in many languages, and it also ignores the type of word storage, which may be relevant. In light of this, researchers tried to seek new explanations in the 1980s.

Caramazza, Laudanna and Romani (1988) proposed the Augmented Addressed Morphology (AAM) Model. The model assumes that lexical access to morphologically complex words takes place through whole-word access units for known words, and

through morpheme-sized access units for unfamiliar morphologically regular words or novel words. Both whole-word and morpheme-sized access units will be activated. Recent and ongoing research strongly supports this model. Based on the AAM Model, further findings suggest that morphological operations crucially co-determine lexical processing.

In the 1990s, psycholinguistic studies distinguished two kinds of representations of the mental-lexicon: 1) access representations, and 2) linguistic representations. The access representations mediate between the perceptual system and the mental lexicon, and the linguistic ones represent semantic and syntactic properties. Sandra gives the following reasons that morphological structure of words could be involved in the mental lexicon:

> At the access level, morphological structure of words could be involved for several reasons: (1) economy of representation, i.e. the absence of access representations for polymorphemic words; (2) access speed, i.e. the use of stem morphemes to achieve fast access to the mental lexicon; (3) computation of sentence structure, i.e. early access to affix representations with the purpose of a fast delivery of syntactically important information to the syntactic module; (4) the automatic creation of processing unites corresponding to frequently occurring letter clusters. At the level of linguistic representations, morphological structure could serve the purposes of (1) economy of representation and (2) acquisition/learning efficiency, i.e. the creation of an efficient retrieval scheme for words. (Sandra 1994a, p. 266)

In other words, Sandra (1994a) argues that morphemes a) might be needed to access a representation of the whole word, b) are used to express morphological relatedness at a post-access level, and c) are used to determine the meaning(s) of the word.

Through evaluating prefix processing and representation in two lexical decision experiments on printed stimuli, Landanna, Burani and Cermele (1994) find that morphological structure is present in both the lexical representations and in the procedures for lexical access. After investigating whether the visual recognition of short prefixed and

suffixed words is affected by their morphological structure, Beauvillain (1994) reports that the morpheme unit is a significant advantage to recognize novel words or nonwords. "Previously experienced words would activate whole-word access units, whereas that recognition of novel words or nonwords would occur through the activation of morpheme units" (Beauvillain 1994, p.334). This morphemic decomposition is not constrained by the sequential organization of the morphemic elements within a word. Zwitserlood (1994) investigated semantic transparency in the processing and representation of Dutch compounds. The study showed that 1) completely opaque compounds are the same as mono-morphemic words and are not connected with their constituents at the level of semantic representations; and 2) fully or only partially transparent compounds, however, are linked with the representations of their constituents, and the constituents clearly contribute to the overall meaning of compounds and produce significant semantic facilitation. Sandra (1994a) argues that there are two parallel access routes in the mental lexicon: one making use of whole-word access representations and post-access connection between morpho-semantically related words; and the other where the meaning of the whole word is computed from its morphemes. In a study by Clahsen (1996), German shows the same distinction as English: regular morphological forms are rule-based in representation, and irregular forms are memory-based in the mental lexicon. These findings provide support for the dual-mechanism model, which, developed from the AAM model, suggests that there are two qualitatively different mechanisms for word formation: one is a rule-based symbolic processor for generating regular forms, and the other is an associative memory for the storage of irregular forms.

Moreover, based on several experimental studies, Chialant and Caramazza (1995) claim that morphological decompositionality is the result of both semantic and formal decompositionality. "Morphological information cannot only be regarded as part of the semantic representation of a lexical item but is also encoded along with the formal properties of the lexical unit at the lexical representation level"(p. 73). In the overview of Hebrew morphological studies, Bentin and Frost (1995) suggest that adult readers are aware of the morphological structure of words even when the morphemic constituents are not phonological units themselves, and that morphological analysis is necessary to activate the meaning of a morphologically complex word. All this constitutes enough evidence for the claim that the organization of a language lexicon includes morphological principles. Baayen, Burani, and Schreuder (1996) present evidence in Italian that even regular noun plurals may be represented as full-forms in the mental lexicon; however, full-form representations do not block morphological processing. They show that, in fact, the combination of both full-form and constituent-morphemes representations speeds up lexical processing.

Psycholinguistic studies have drawn a picture that morphological processing in the mental lexicon is not an all-or-none issue. Whole-word forms and morphological units are both in the mental lexicon. Morphological structure plays a very important role in word recognition, language comprehension and production, and it helps native speakers memorize, understand and use the vocabulary of a language.

2.2.2 Morphological Structure and Language Learning

The results of experimental data on vocabulary learning strongly suggest that morphemes do play a role in word learning. A longitudinal study by Carlisle (1995),

which was designed to investigate the development of morphological awareness of children in the early school years (from kindergarten through second grade), has found that kindergartners have trouble with a morphological awareness task, but first and second graders show significantly better morphological and phonological awareness on word analysis and reading comprehension tests. The results of this study indicate that there is a relationship between morphological awareness and reading achievement in the early school years. Carlisle (1995) argues: "morphological awareness may be particularly important for older students because morphological decomposition and problem-solving provide one way to understand and learn the large number of derived words used in the books they read" (p. 205). Schenck (1982), in the same manner, describes English vocabulary strategy performances of 72 students (adults) at four different levels. This study reveals the fact that memorization, application and generalization of 'word part' (morpheme) information are significant predicators of vocabulary score performance. It suggests that "knowing sets of word part rules, application of those rules and generalizations from those rules were the over-all predictors of good or poor scores on the criterion vocabulary test" (Schenck 1982, p. 94). Sandra (1994a, 1994b) also shows that the young adults he studied learned derived words with familiar root morphemes and developed a root-based memory encoding.

With a simple simulation of language learning, Smith (1995) examined whether acquiring complex morphemic systems poses formidable problems for the learner. He claims: 1) morphemic structures project in a systematic way; 2) linguistic features help the learner, and a totally regular pattern is learned more quickly than irregularities or a set of patterns without morphemic structure; 3) morphemic processing may be an area where

individual differences are substantial, and these differences might be derived mainly from linguistic experience and education; 4) generalization to new instances is patchy, unless sufficient examples are given of the productivity of a given morpheme; and 5) the irregularity in a set of patterns affects the ways the entire set of patterns is represented and processed. Furthermore, the simulations in a study by Gasser (1996) shows that "performance on word recognition and production tasks is facilitated when there has been previous training on a morphologically similar task" (p. 111).

In summary, studies have shown that morphological structure is directly related to vocabulary performance and reading achievement. Native speakers of different languages are all aware of morphological structure and apply it to their vocabulary learning and memorization. By using such knowledge, native speakers can learn a large number of derived words quickly.

2.2.3 Morphological Structure in Chinese Learning Process

Words in Modern Chinese are mainly monomorphemic or bimorphemic ones developed from monomorphemic words of Classical Chinese by morpheme combination or affix addition. Most morphemes in Chinese are monosyllabic, and each syllable in turn is represented by a character in writing. As the Chinese character is the only unit of written representation, word boundaries are not explicitly marked at all in written texts. Thus, the concept of word in Chinese is always fuzzy. Furthermore, in the view of cognitive economy, the character is perhaps the most convenient unit for storage since more than a million Chinese words are made up of about 4,500 characters (Wang 1986). Because of this, Hoosain (1992) suggests that the mental storage of morphemes in Chinese plays a greater role than is the case in English, and "it would be likely that a greater proportion of

multimorphemic words in Chinese (compared with English) is not necessarily listed in the lexicon but instead have meanings arrived at in the course of language use" (p. 126). Moreover, the unique features of Chinese can probably affect processing strategies used in reading Chinese texts. Characters perform the role of basic perceptual units in Chinese reading in much the same way as words do in alphabetic reading (Chen 1992).

In a study by Zhang and Peng (1992), the hypothesis that representations of Chinese words are stored in morphologically decomposed form was investigated through three lexical decision experiments in which character frequency, word frequency and morphological structure were the stimuli. The study suggests that all two-character words are stored in decomposed form, and that morphological structure information, which includes the word type, the grammatical class of the characters, the distance and the strength between the two characters in the lexicon, etc., determines the relationship of the two characters. In coordinative (parallel) words, the two characters are equally important; but in modifier-head words, the character of the head is the main morpheme. Meanwhile, the frequency of the word and that of the character will also affect the storage of Chinese words. In another study, however, Zhou and Marslen-Wilson (1994) argue that Chinese disyllabic words are represented as wholes in the mental lexicon. Nonetheless, they also conclude that the morphological structure of disyllabic words is represented at both the word and morpheme levels. Based on previous studies, Liu and Peng (1997) present a processing model of Chinese compounds as shown in Figure 2.1.

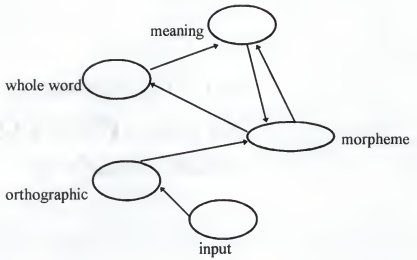

Figure 2.1 The Processing Framework of Chinese Compounds (Liu and Peng 1997, p. 229)

This model suggests that the whole word and the morpheme overlap to some extent at the meaning level: when the activation level of the whole word meaning starts to rise, the morphemes of transparent words will receive facilitative feedback from the word meaning and, on the other hand, will send more activation to the whole word meaning. All these studies indicate that morphological structure does play a more important role in Chinese language processing than in the case of English or some other languages.

2.3 Theoretical Implications

The theories of SLA and the results of psycholinguistic studies discussed above directly and indirectly point to what should be taken into serious consideration in the vocabulary pedagogy of CFL/CSL and how language pedagogy can help learners acquire vocabulary effectively. The theories provide the following guidelines:

1. Vocabulary acquisition can be accelerated by formal instruction that is carefully designed to match the developmental stage and learning style of the learner, and by offering word rules with sufficient opportunities for interaction and language data exposure.
2. Vocabulary acquisition can be successfully carried out by training in applying various learning strategies. Learners should be led to focus on both the form and meaning of language input, and to analyze, generalize and use rules derived from the input.
3. Psycholinguistic studies have shown that morphemes play an important role in mental lexicon and word-learning processing. Given these findings, word structure and morphological rules will accelerate the vocabulary learning progress. Knowledge of morphology should be an important part of vocabulary instruction and must not be ignored in vocabulary teaching in CFL.
4. Modern Chinese vocabulary is morpheme-based. A lot of the lexical items are compounds. Studies have found that morphological structure is more important to vocabulary recognition and lexicon memory in Chinese than in many other languages. This means that the characteristics of Chinese words should be fully utilized in pedagogy in order to facilitate Chinese vocabulary learning. Moreover, since written texts of Chinese appear in largely morphemic characters, the latter should also play an important role in Chinese vocabulary pedagogy and acquisition.

CHAPTER 3
CHARACTER RADICAL AND WORD STRUCTURE IN CHINESE WORD INFERRING BY NATIVE SPEAKERS

3.1 Research Questions and Assumptions

As discussed in Chapter Two, psycholinguistic studies strongly indicate that morphology plays an important role in mental lexicon and word recognition. This claim applies to Chinese even more truly (Hoosain 1992) because most words in the language are morphologically analyzable compounds, which are written mainly in self-contained morphemic characters without any marking for word boundary. Experimental studies also show that Chinese morphological structure is present in mental lexicon and that it serves important functions in word recognition and comprehension. Despite all this, there has not been a single study on how frequently morphological structure is used in word inference, and whether or not Chinese speakers usually derive the meaning of an unfamiliar word by morphological structure and by the meaning of the component morphemes. Furthermore, there are other unanswered questions. For example, what kind of words can be understood easily through morphological structure and what kinds of word meaning are difficult to be inferred? When and how can word meaning be inferred correctly? When is context information necessary to guess a word meaning? Is the frequency of this inference affected by the education level of the speaker? More research is needed to find the answers to these important questions.

Based on previous psycholinguistic studies and observations of what native Chinese speakers usually do, this study proposes the following hypotheses:

1. Native Chinese speakers can infer the meanings of unfamiliar words without consulting any dictionary in their reading.
2. The strategies used in the inference involve the use of morphological knowledge in the mind of the native speaker, even though s/he is not explicitly taught such knowledge and skill.
3. The knowledge of character structure, especially the information on meaning from the radical, is an important part of the strategies to infer the meaning of an unknown character.
4. Chinese speakers, just like native speakers of other languages, can use contextual information to infer the meanings of unfamiliar words .

In order to test these hypotheses, a series of investigations were conducted in this study. The results of these investigations also provided the answers to the following research questions:

1. When do native Chinese speakers infer the meaning of a compound word by word structure?
2. Can native speakers also infer the meaning of a mono-morphemic word through the radical of a Chinese character?
3. Do they infer the meanings of unfamiliar words more frequently as they become more educated?
4. What kind of words have meanings that can be more easily inferred?

5. When is contextual information necessary to infer a word meaning?

The investigations and the results are discussed in the following sections.

3.2 Research Design

3.2.1 Data Collection

A series of investigations, which include a survey, a word test and an interview, were conducted. The survey was first designed in this research to collect data on what native Chinese speakers think they do when they encounter an unfamiliar word in their reading. Information on the participants' backgrounds, such as educational levels and their usual reading materials, were also solicited. Then, a follow-up word test was designed to check against the results of the survey and to see if native speakers can truly infer the meanings of unfamiliar words by radicals, morphological knowledge and context. This part of the data collection (i.e. the survey and the word test) was mostly done in Mainland China in 1998. Finally, an interview was undertaken to seek detailed facts about when and how a word meaning is inferred. The interview was done at the University of Florida.

3.2.2 The Participants

The participants of the survey and test were 184 Chinese native speakers at different educational levels. Among them, 54 were junior middle school students from two different classes in the same school, 53 were high school students from two different classes in another school, 53 were students with different majors in a teacher training school and 24 were randomly selected graduate students studying in the United States. Each student was given the survey first and then was asked to take part in the-paper-and-

pencil word test. Most of the participants worked under monitors inside classrooms to make sure that they finished the survey and test according to the requirement.

The participants of the interview were fifteen Chinese graduate students in different majors at the University of Florida. Among them, two were from Taiwan and others were from Mainland China. They were randomly selected, and were asked to infer the meanings of the test words one by one and to describe how they reached their answers.

3.2.3 The Survey

Questions about how native Chinese speakers recognize unfamiliar words were designed for a survey to find out about strategies that the subjects thought they use in their Chinese-word recognition, together with information on participants' educational levels and other backgrounds. Questions were either multiple-choice or open-ended in order to get as much information as possible (see Appendix A). Since participants usually do not like to spend much time answering a survey, the survey was designed to take no more than 5-10 minutes.

3.2.4 The Word Test

In spite of the usefulness of a survey, a technique of high-quantity data collection, there are weaknesses as well. One of the weaknesses is in the possibility that the collected answers may be merely what the participants think they do but may not be what they really do. The answers should be checked for reliability and validity against the information obtained in a more objective manner. Moreover, the survey cannot tell us what strategy was used in inferring a word meaning and when it was used, or if the meaning inference

was correct or not. For these reasons, a word-test was designed and presented to the participants after they answered the survey.

In the test, the participants were required to infer the meanings of some words without consulting any dictionary or reference material. They were asked to write down a general meaning (e.g. a kind of animal, plant) or a detailed meaning of each test word if they could. They were also asked to put a question mark "?" beside an unfamiliar word and then to write down the possible meaning(s) they could infer. If no meaning could be inferred, a blank was left. The test words were either Classical Chinese, new terms just appearing in modern Chinese, dialectal terms, nomenclature (i.e. terms only used in specific professional areas like chemistry, botany, medical science, etc.), or words used only in Taiwan but not occurring in the Chinese of Mainland China. All of them were supposedly unfamiliar to the participants. The types of test terms were either mono-morphemic words or compounds. They were arranged randomly in the test. The character radicals of the mono-morphemic words either presented some hint of the meaning categories (e.g. plant, an action of hands, animal) or did not link with the meaning directly. The structure types of the compounds were varied, including these of modifier-head, verb-object, parallel and noun-verb. Some of the compounds were opaque, and their meanings were not directly related to their roots or component morphemes. The test consisted of two parts. Part A was a list of 30 individual words without any context. Part B contained 15 test words placed in sentences in order to check whether or not context information is helpful to infer the meanings. Nine of the 15 words also appeared in Part A in order to verify if the meaning was more likely to be inferred when the context is present. Thus, the participants were asked to do the word list first, and then move to

the second part. After they moved to or finished Part B, they were not permitted to move back to check or revise the answers of Part A.

Before the survey and word-test were actually used in the field, both were tested in a pilot project. Then they were revised to delete some problematic items.

3.2.5 The Interview

Subsequent to the above tasks, a verbal-report interview was conducted to check on the results of the survey and the word test. The technique of a verbal-report can infer the cognitive processes of participants involved in some learning tasks and can reveal information that might otherwise be hidden or lost from the researcher. Since dictionary use has always been emphasized in traditional school education in China, the participants might have tried to avoid inferring the meanings of unfamiliar words when they were answering the questions. This would affect the accuracy of the study, and the results would not reflect the facts in the word recognition process of native Chinese speakers. Furthermore, the answers of the survey and word test cannot tell how participants reached a right or wrong meaning, and what kind of clue they mostly paid attention to in the process of lexical inference. The interview was intended to find out possible variables that might affect the accuracy of the findings and the cognitive processes of participants.

The same questions of the survey and test were used in the interview. Interviewees were asked to guess at the meaning of each word in the test as much as they could and to think aloud about what hint or clue they had adopted to get the meaning. All the answers were written down by the interviewer immediately for subsequent analysis. The results were compared with those of the survey and word test.

3.3 Results

The results of the survey, the interview and the two parts of the word-test were calculated separately and compared with each other. The answers of the participants at different educational levels were also calculated separately in order to see if there were any differences between these groups. Details of the results are given in the following subsections.

3.3.1 Results of the Survey

Table 3.1 presents the results of strategy-use reported in the survey. Group A are the students in a junior middle school, Group B are the high school students, Group C are the students in the teachers training school, and Group D are the graduate students. The designation "Dictionary" means that a dictionary was most likely used when an unfamiliar word appeared in reading. "Surmise" means that the meaning of the word was most likely inferred at when an unfamiliar word came about. "Both" means that both inferencing and consulting a dictionary were employed. Generally inferencing was first, and, if not successful, consulting a dictionary was accomplished. "Ignore" means no attempt was made to arrive at the meaning. The numbers and percentages are listed under the headings below.

The results in Table 3.1 indicate that guessing the meaning of an unknown word was frequently used by native Chinese speakers. In the data, a total of 67 participants (36.4%) reported that they only surmise the meanings of unfamiliar words without the help of any dictionary or other means. Sixty (32.6%) of them reported that they usually guessed at word meanings first and, if not successful, tried to find the answers in a

dictionary. In other words, about 69% of participants (127) reported that they would guess at the meaning when an unfamiliar word appeared in their reading, though about half of them would also consult a dictionary. This percentage (69%) is very high. The real percentage could be even higher. Since students are always encouraged to use dictionaries in Chinese schools, especially in primary and secondary schools, some of the participants in the survey might have been reluctant to admit that they did not use a dictionary. In the interview, however, 100% of the interviewees reported that they would guess at the meaning of an unfamiliar word first, and dictionaries were seldom used (cf. the results of the interview).

Table 3.1 Strategy-use reported in the survey

Group	Dictionary	Surmise	Both	Ignore	Total
Group A	34 (63%)	4 (7.4%)	16 (29.6%)	0	54
Group B	7 (13.2%)	27 (51%)	19 (35.8%)	0	53
Group C	14 (26.4%)	15 (28.3%)	23 (43.4%)	1 (1.9%)	53
Group D	1 (4.2%)	21 (87.5%)	2 (8.3%)	0	24
Total	56 (30.4%)	67 (36.4%)	60 (32.6%)	1 (0.6%)	184

Table 3.1 also shows that the groups at different educational levels usually adopted different methods to arrive at a word meaning. Among the students of the junior middle school, 63% of them reported that they would use a dictionary to look for the meaning of an unfamiliar Chinese word. The percentages for other groups are much lower. For Groups B and C, i.e. the high school students and the teacher trainees, the percentages are 13.2% and 26.4%, respectively. Only one student in Group D reported that a dictionary was usually used. In terms of inferencing, however, only 7.4% of group A reported

positively. The other groups reported much higher percentages. For Groups B and C, 51% and 28.3% of them reported, respectively, that they mainly guessed at the meaning of an unknown word. For Group D, as high as 87.5% reported doing so.

The results show that the method of arriving at word meanings co-varies with the educational level of the native speaker. The lower the educational level of a Chinese speaker is, the more likely a dictionary is used. The higher the educational level of the speaker is, the more likely other strategies are used. We can rearrange the table according to educational levels and use a chi-square test to check whether the difference occured just by chance or is indeed statistically significant. Since Groups B and C, the high school students and the teacher trainees, are at the about same educational level, they are calculated together.

Table 3.2 The chi-square test of the strategy-use in different groups

	Group A	Group B & C	Group D	Total
Dictionary	34	21	1	$n_{i1}=56$
Inferring	4	42	21	$n_{i2}=67$
Total	$n_{j1}=38$	$n_{j2}=63$	$n_{j3}=22$	N=123
$E=n_in_j/N$,	$\chi^2=\Sigma(O-E)^2/E=48.27$	$\alpha=(n_i-1)(n_j-1)=2$		$p=3.3\times10^{-11}<0.001$

Note: E= expected number, O = observed number, α = degree of freedom p = the probability of null hypothesis

In the above test, the probability of the null hypothesis (i.e. no significant difference between test groups) is very low ($p=3.3\times10^{-11}$) and is much less than 0.1% (0.001). This means that the chance of having a significant difference between these groups is more than 99.999%, and that the null hypothesis can be rejected. The result of

the chi-square test demonstrates that strategy-use varies with the educational level of native Chinese speakers. It is confirmed that the higher the educational level of the native speaker is, the more inferring will be used to reach the meaning of an unknown word.

Context, character radicals and word-structure were variably listed by individuals as the information sources by which to infer the meanings of unfamiliar words. The numbers and percentages of each information source are summarized in Table 3.3.

Table 3.3 List of using different knowledge to infer a word meaning

	Group A n=54	Group B n=53	Group C n=53	Group D n=24
Context	48 (89%)	43 (81.1%)	46 (87%)	24 (100%)
Radical	34 (63%)	20 (37.7%)	36 (68%)	18 (75%)
Word-structure	28 (52%)	18 (34%)	11 (20.75%)	17 (70.83%)

As presented in the table, most of the participants in each group reported that contextual information was used to infer word meaning. The percentage in each group is more than 80%, and it even reaches 100% in Group D. This shows that contextual information is very important in meaning inferring. Many of them also reported that the knowledge of radicals was also used frequently. Compared with contextual information and the knowledge of radical, word-structure, however, was reported to be used less frequently. The reason may be that many participants in the survey took word-structure for contextual knowledge, since Chinese is printed in characters without explicitly marked word boundary. The results of the word test and the interview show that word-structure knowledge is actually used frequently in meaning inferring. This will be discussed below.

3.3.2 Results of the Word Test

As stated before, the test is divided into two parts. Part A consists of 30 words, and Part B consists of 15 words. Each of the words is worth one point and the whole test is worth 45 points in total. Participants were asked to mark all the unfamiliar words with a "?" or circle all the words familiar to them. The participants were instructed to give meanings of both the familiar and unfamiliar words. One point was awarded if a correct meaning, either general or detailed, was given for an unfamiliar word. Since the test was designed to find whether the subject can infer the meanings of unfamiliar words, no point was awarded for familiar words, even if a right answer was given. To most of the participants, all the test words were unfamiliar. Fewer than twenty of them marked only one or two words as familiar, but these exceptions were ignored in the statistics. That is, for a few participants the sum of points is less than 45. But those cases were not taken into consideration because the difference is so small that it is negligible. The results of the word test are summarized in Tables 3.4, 3.5 and 3.6, respectively, for Part A, Part B, and the whole test. Figures 3.1, 3.2 and 3.3 diagrammatically describe the respective tables in curves.

The tables and figures show that more participants in Group A got lower grades than those in the other groups. For most participants of Groups B, C and D, the meaning of 37%-50% of the words (from 11-20) could be inferred in Part A and those of 73%-100% (from 11-15) words could be correctly reached in Part B.

Table 3.7 displays the mean (i.e. average grade) of each group. The numbers indicate that, on average, the participants were successful in guessing the meanings of

37% of the words in Part A, 77% of the words in Part B. In total, about 50% of the words' meanings were correctly inferred in the whole test.

Table 3.4 Results of test Part A

Score Range	Group A n=54	Group B n=51*	Group C n=53	Group D n=24	Total N=182
1-5 (3%-17%)	22 (40.7%)	3 (6%)	2 (3.%)	0	27 (14.8%)
6-10 (20%-33%)	26 (48.1%)	17 (33.3%)	5 (9.4%)	3 (12.5%)	51 (28%)
11-15 (37%-50%)	5 (9.3%)	16 (31.4%)	31 (58.5%)	8 (33.3%)	60 (33%)
16-20 (53%-67%)	1 (1.9%)	14 (27.5%)	15 (28.3%)	12 (50%)	42 (23.1%)
21-25 (70%-83%)	0	1 (2%)	0	1 (4.2%)	2 (1.1%)
26-30 (87%-100%)	0	0	0	0	0

*Note: There were 53 participants in this group, but the answers of two participants did not follow the instructions and their answers were thus excluded from the statistics.

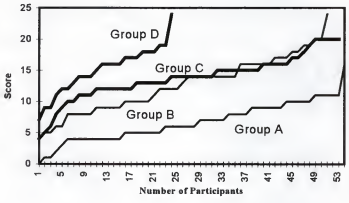

Figure 3.1 Results of test Part A

Table 3.5 Results of test Part B

Score Range	Group A n=54	Group B n=51	Group C n=53	Group D n=24	Total N=182
1-5 (7%-33%)	22 (40.7%)	0	1 (1.9%)	0	23 (12.6%)
6-10 (40%-67%)	28 (52%)	3 (5.9%)	3 (5.7%)	0	34 (18.7%)
11-15 (73%-100%)	4 (7.4%)	48 (94.1%)	49 (92.5%)	24 (100%)	125 (68.7%)

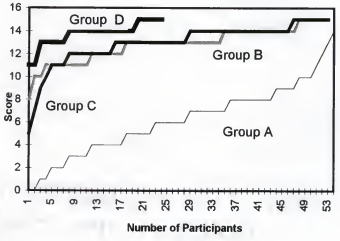

Figure 3.2 Results of test Part B

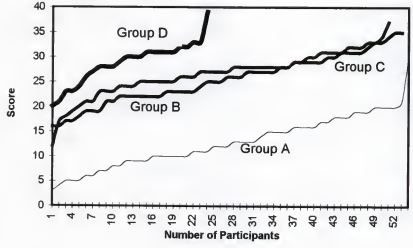

Figure 3.3 Results of the whole test

Table 3.6 Results of the whole test

Score Range	Group A n=54	Group B n=51	Group C n=53	Group D n=24	Total N=182
1-5 (2.2%-11.1%)	5 (9.3%)	0	0	0	5 (2.7%)
6-10 (13.3%-22.2%)	17 (31.5%)	0	0	0	17 (9.3%)
11-15 (24.4%-33.3%)	14 (26%)	0	1 (1.9%)	0	15 (8.2%)
16-20 (35.6%-44.4%)	16 (29.6%)	8 (15.7%)	3 (5.7%)	0	27 (14.8%)
21-25 (46.7%-55.6%)	1 (1.9%)	18 (35.3%)	15 (28.3%)	5 (20.8%)	39 (21.4%)
26-30 (57.8%-66.7%)	1 (1.9%)	14 (27.5%)	25 (47.2%)	9 (37.5)	49 (27%)
31-35 (68.9%-77.8%)	0	10 (20%)	9 (17%)	10 (41.7%)	29 (16%)
36-40 (80%-88.9%)	0	1 (2%)	0	0	1 (0.55%)
41-45 (91.1%-100%)	0	0	0	0	0

Table 3.7 Means (average scores) of the word test

	Group A n=54	Group B n=51	Group C n=53	Group D n=24	Total n=182
Part A	6.67 (22%)	12.63 (42%)	13.77 (46%)	15.04 (50%)	11 (37%)
Part B	6.19 (41%)	12.76 (85%)	12.94 (86%)	13.75 (92%)	11.5 (77%)
Whole	12.9 (29%)	25.4 (56%)	26.7 (59%)	28.8 (64%)	22.5 (50%)

It is true that the test is limited in scope due to the small number of test words and the nature of the words. The results, therefore, do not accurately reflect the actual percentage of times that native speakers use different strategies to reach the meaning of an unfamiliar word in real life. Nevertheless, the results at least suggest that native speakers

do infer the meanings of many unfamiliar words on the basis of contextual information, their knowledge of character radicals and their knowledge of word structure. The results of Part A in the test reveal that approximate meanings of unfamiliar words can be reached by means of character radicals and word structure, but the rate of correct answers is somewhat low (37% on average) when only the knowledge of character radicals or word structure is applied. When contextual information is added and combined with the other two, the meaning of an unknown word could be reached in most cases, as is shown by the high scores of Part B (77% on average). Obviously, there is a high correlation between the availability of contextual information and the chances of correct inference.

On the other hand, all the tables and figures indicate that the higher the educational level of a native speaker, the higher the scores s/he can receive. This fact is clearly reflected by the curves in the three figures above: Group A at the lowest educational level is always at the lowest position, Group D at the highest level of education is at the top, Groups B and C at comparable levels of education are in the middle. The results also match the corresponding results of the survey (see section 3.3.1 and Table 3.2). The facts clearly indicate that school education does affect native speakers' ability to guess the meaning of a new word by means of 1) the radical knowledge of character, 2) morphological structure of the word, and 3) the context in which it appears.

To ascertain that the figures are significant, the test of ANOVA was used to examine the differences between the means of the four groups in the whole test, and to decide whether those differences are likely to happen by chance or by the variance of educational levels (see Table 3.8).

For 3/178 degrees of freedom, the F-ratio should be 3.91 for a 0.01 level of probability. As presented in Table 3.8, the F-ratio in this test is much greater (54.5 > 3.91). This means that the probability of the null hypothesis, i.e. that differences happened by chance, is less than 1% and can be rejected. Therefore, the differences of the four groups are significant, and it can be assumed that these differences are due to variance in educational levels.

Table 3.8 ANOVA test of the four groups

	Group A	Group B	Group C	Group D	Totals
n	54	51	53	24	N=182, K=4
ΣX	695	1295	1415	691	4096
ΣX^2	10487	34205	38851	20325	107468
$(\Sigma X)^2$	483025	1677025	2002225	477481	16777216

$SST = \Sigma X^2 - (\Sigma X)^2 / N = 15825.5$

$SSB = [(\Sigma X_1)^2 / n_1 + (\Sigma X_2)^2 / n_2 + (\Sigma X_3)^2 / n_3 + (\Sigma X_4)^2 / n_4] - (\Sigma X)^2 / N = 7318$

$F = MSB / MSW = [SSB / (K-1)] / [(SST - SSB) / (N - K)] = 54.5 > 3.91$

d.f. $B = K - 1 = 3$, d.f. $W = N - K = 178$, $p < 0.01$

Note: N= number of participants, K = number of groups, X = grade
SST (the sum of squares total) = the total amount of variation,
SSB (the sum of squares between the groups) = variability between groups
MSB = the mean square between groups
MSW = the mean square within groups
F = Fisher-ratio
d.f. B = degree of freedom between groups
d.f. W = degree of freedom within groups

3.3.3 Results of the Interview

The interview results are summarized in Tables 3.9 and 3.10. The goals of the interview were to find out how native speakers of Chinese guess the meaning of an

unfamiliar word and to check on the results of the survey and the word test. The interviewees were fifteen Chinese graduate students in the U.S.A, with thirteen of them from mainland China and two of them from Taiwan. All the interview questions were the same as in the survey and the word test in order to verify the data collected by these two research techniques.

Table 3.9 Results of the interview

Method	Dictionary	Surmise	Total
Number	0	15 (100%)	15
Test	Part A point=30	Part B point=14 *	Whole Test point=44
Mean	15.5 (51.8%)	13.73 (98%)	29.3 (66.5%)

*One word in Part B was familiar to many interviewees and was dropped from the score.

In the interview, 100% of the interviewees reported that they mostly infer the meanings of unfamiliar words. On average, the meaning of more than 50% of the words in Part A were inferred correctly, and about 98% of them in Part B were inferred correctly. Since Part A was designed to separately test the usefulness of character radicals and word structure in lexical recognition, the words of different types were listed. They include mono-morphemic words, modify-head compounds, verb-noun compounds, noun-verb compounds and parallel compounds. The average score that interviewees received for each type is listed in Table 3.10. The average number each method was used (i.e. to use radical knowledge, word structure, or both of them to infer a word meaning) are also shown in the table.

In Part A, there were altogether eleven mono-morphemic words and nineteen compounds. For the mono-morphemic words, only radical knowledge could be used to infer their meanings, and about 43% of them were guessed correctly on average. For the compounds, either morphological structure or radicals or both could be used to infer the meanings with, and about 57% of them were guessed correctly. The results suggest that the meanings of unfamiliar compounds are easier to infer than those of new mono-morphemic words. To make sure that the difference is not due to chance, a t-test was used to check the average scores of interviewees for mono-morphemic words and compounds. The probability of the null hypothesis, i.e. there is no difference between the two groups, is less than 1% ($p=0.0047 < 0.01$). Thus the null hypothesis can be rejected. This means that the score difference due to word type is significant, and that the meanings of Chinese compounds are truly easier to infer than those of mono-morphemic words.

Table 3.10 Average scores to different words and average times of method use in Part A.

	Single n=11	M-H n=13	V-N n=2	N-V n=1	V-V n=3	All Compounds n=19	
Mean	4.7 (43%)	7.7 (59%)	0.93 (47%)	0.47 (47%)	1.73 (58%)	10.83 (57%)	p= 0.0047
Radical	10	1	0	0	0.5	1.5	
WS	0	6	2	1	2	11	
Both	0	4	0	0	0	4	

Note: Single = mono-morphemic word, M-H = modify-head compound, V-N = verb-noun compound, N-V = noun-verb compound, V-V = verb-verb compound, WS = word structure, p= probability of the null hypothesis in t-test.

In the test, as the number of different types of compounds is highly limited, the results cannot show which type of compound is easier to infer than others by the radicals or by the word structure. There is a tendency, however, as shown in Table 3.10, that the meanings of modifier-head compounds and V-V parallel compounds (the Vs can be action verbs or state verbs) are more successfully guessed than those of other types. The reasons are discussed in section 3.4.

3.4 Analysis and Discussion

The results of the investigations show that native speakers of Chinese frequently infer the meanings of unfamiliar words in their reading, even though they are not encouraged to do so when they are in school. The knowledge of character radicals and word structure, as well as contextual information, is used by native speakers in inferring. The more knowledge or information available, the more successful the inferring will be. In Part B of the test, where words were given in contexts, participants could combine together the knowledge of character radicals, the knowledge of word structure and contextual information to infer the meaning of each test word. The results show that, on average, 77% of the word meanings in Part B were inferred correctly (see Table 3.7). The percentage for the same part is even higher in the interview, reaching 98% (see Table 3.9). If contextual information is not available, as in Part A of the test, the percentage of success is lower. Only about 35% of the test words in that part were inferred correctly in the test (see Table 3.7), and the percentage is 51.8% in the interview (see Table 3.9). The percentage may be even lower if only the knowledge of radicals or the knowledge of word structure alone is available. In the interview, only 43% of mono-morphemic words were

inferred successfully (see Table 3.9), because only knowledge of radicals could be consulted.

The results of both the survey and the word test reveal that inferring the meaning of a word is affected by the educational level of the participants. Highly educated speakers do more inferring than less highly educated speakers, and they also do it with a higher rate of success. The reasons may be as follows:

1. A highly educated speaker may have more knowledge of word structure than a less educated speaker. While the knowledge of character radicals is usually introduced in primary school, the knowledge of word structure, is seldom taught in schools in either Mainland China or Taiwan. Native speakers of Chinese usually accrue this knowledge by themselves through the use of the language. The higher the education a speaker receives, the more experience of reading and writing s/he is likely to have; therefore, the more word structure knowledge s/he may have acquired. It has been found that Chinese fifth graders at an elementary school could use some morphological knowledge to get the meanings of some unknown words (Shu et al, 1995); however, the knowledge acquisition of Chinese word structure is probably completed after a native speaker has completed middle school.
2. A speaker with a higher educational level would have fewer unfamiliar words and more background knowledge in reading; therefore, more contextual information can be used to infer the meaning of an unfamiliar word.
3. A more educated speaker could have a better ability of deducing a conclusion from separate pieces of information.

Furthermore, the results of the interview show a tendency: the meanings of some types of compounds, such as modifier-head compounds and verb-verb compounds, could be inferred more easily than those of other types.

The modifier-head (M-H) compound is a common and productive type of words in Modern Chinese. The type is very familiar to native speakers. On average, the meanings of 59% of such compounds were inferred correctly in the interview, and the percentage is higher than those of other types of compounds (see Table 3.10). In the interview, if the meaning of the head was known, the general meaning of a whole M-H compound would be reached easily, even if the meaning of the modifier was unclear. For example, in the interview, thirteen interviewees inferred correctly that 西饼屋 *xi-bing-wu* (western-cake-house, 'bakery') is "bakery shop", "cake shop" or "the place of making cakes and bread"; twelve of them answered that the meaning of 疍民 *dan-min* (Dan-people, 'a kind of boatman in southern China') is "a kind of people" or "a minority"; and all of them inferred successfully that the meaning of 蓐草 *ru-cao* (mat-grass 'straw for making mat') is "a kind of grass" or "the straw used on bed", even though they did not know the first character. When the head was unfamiliar, the meaning of the whole M-H compound might also be inferred correctly by the character radicals. For instance, 跳蝻 *tiao-nan* (jump-nymph 'the nymph of a locust') was guessed successfully by fourteen interviewees as "a kind of insect which can jump" or "a small jumping insect". "蝻" was an unfamiliar character to all of the interviewees, but its radical 虫 *chong* ('insect, worm') hints that this character could mean 'a kind of insect'.

A V-V compound is also termed 'parallel compound'. The two verbal morphemes in such a compound usually are synonyms or have similar meanings, and the

meaning of such a compound is generally similar to the individual meanings of its components. Therefore, if the meaning of either of the components is known, the meaning of the compound is easy to infer. In the interview, thirteen interviewees correctly indicated that 生荒 *sheng-huang* (immature-waste 'virgin soil, uncultivated land') is "immature land", "the land without plants", "a remote place" or "uncultivate, waste". In the word 迻译 *yi-yi* (move-translate, 'translate; translation'), the first character was unfamiliar to all the interviewees, but eight participants still reached the right meaning of the compound as "translate", " translation" or "explain, explanation".

The meanings of verb-noun (V-N) compounds and noun-verb (N-V) compounds, as shown by the results of the interview, may be more difficult to infer. There are two V-N compounds listed in Part A: 抓膘 *zhua-biao* (grab-fat, 'to fatten') and 植字 *zhi-zi* (plant-character, 'to set type for printing'). Only three interviewees arrived at the right meanings. Since the number of such compounds in the test was seriously limited (there are only two V-N compounds and one N-V compound), the result is not reliable. Perhaps the reason for the low success rate in the case of the compound 抓膘 *zhua-biao* 'to fatten' is that the meaning of the compound is not directly related to the meanings of its components. For the compound 植字 *zhi-zi* 'to set type for printing', the reason could be that interviewees lacked the background knowledge of the special field where the word is used. Many interviewees thought it meant "to borrow a character", "to create a character", or "to type a character", all of which were close but not exactly correct. In this kind of situation, contextual information is needed. When 抓膘 *zhau-biao* occurs in a sentence in Part B, all the interviewees reached the right meaning through the contextual information. Another example is an M-H compound 素磬 *su-qing* (white-chime stone,

'jasmine'). Its meaning is metaphorical and thus opaque from the meanings of its components. When it was listed individually, it was incorrectly inferred by most of the interviewees as "a kind of chime stone" or "a kind of musical instrument", but none of them inferred the right meaning. When it appeared in a suggestive sentence in Part B, all of the interviewees realized that it is a kind of flower.

As discussed above, when only the knowledge of character radicals could be used, the inference was less successful. Therefore, mono-morphemic words (either monosyllabic or disyllabic) need the help of contextual information to infer the meanings correctly. The results of the test and the interview show that the knowledge of character radicals could be very helpful in inferring the approximate meaning of an unfamiliar word. In the interview, 捩 *lie* ('turn around, twist') was frequently inferred as "an action of hand" (扌means 'hand'), and 槎 *cha* ('raft') was mostly answered as "an instrument made with wood" (木 is 'wood'). More than ten participants thought that 芙蕖 *fuqu* ('lotus') is "a plant" (⺾ is a symbol of 'grass'), that 蹀躞 *diexie* ('to walk with small steps') should be "an action of feet" (足 is 'foot'), and that 麏 *jun* ('river deer') could be "an animal like deer" (鹿 is 'deer'). On the other hand, however, if only the knowledge of radicals is used, it may lead to an incorrect conclusion. For example, 砗磲 *chequ* ('giant clam, tridacna') is a disyllabic but mono-morphemic word listed in both Part A and Part B of the word test. In Part A, none of the participants reached its correct meaning. Many of them just thought it was "an instrument made of stones" or "a stone-paved road or a canal". The reason is that they were misled by the radicals: 石 'stone', 车 'vehicle' and 渠 'canal, ditch'. Another example is the V-V compound 萌孽 *meng-nie* (sprout-tiller, 'to sprout') which was listed individually in Part A. In the interview, only five participants

arrived at the right meaning "to sprout" by the first character and the word structure, and others answered incorrectly, thinking that it "is a plant" by only noticing the radical ++ 'grass'. These results demonstrate that the knowledge of character radicals is important in inferring the meaning of an unfamiliar Chinese word, but it is more effective when combined with the knowledge of word structure and contextual information.

3.5 Conclusion

The results of the survey, the word test and the interview provide some answers to the questions raised at the beginning of this chapter:

1. Native Chinese speakers frequently infer the meanings of unfamiliar words in their reading instead of consulting a dictionary.
2. The knowledge of character radicals and word structure as well as contextual information form the basis from which native speakers infer a word's meaning.
3. The frequency and the successful rate of inferring the meaning of an unfamiliar word are affected by two facts: a) the educational level of the native speaker, b) how much information and knowledge are applied. The higher the educational level a native speaker has, the more inference s/he uses and the more success s/he achieves; the more knowledge of character radicals, word structure and context are provided and used, the more frequent and successful is the inferring.
4. The structural type of a word may also affect the success of its meaning inferring. The meanings of the words with a common and productive

structure, such as modifier-head compounds and parallel compounds, can be inferred more successfully and accurately.

5. The meaning of a mono-morphemic word or an opaque compound (i.e. its meaning is opaque from its components) is usually difficult to infer in isolation, and contextual information is needed to reach an accurate meaning.
6. Since the knowledge of Chinese word structure usually is not taught in school, it is acquired naturally by native speakers themselves. In my investigations, the students in a junior middle school used such knowledge less and more unsuccessfully in meaning inference than all the other participants. Thus, the acquisition is probably completed after a speaker attains a middle school education, or at an educational level corresponding to middle school.

The survey, the word test and the interviews in this research have yielded information that previous studies have not touched on. The results show that, through context, the knowledge of character radicals and the knowledge of word structure, a native speaker understands and learns a new word. This suggests that the knowledge of radical and word structure, as well as contextual information, is an important tool to help people learn Chinese words quickly and easily. Thus, in order to help L2 learners of Chinese acquire Chinese words more effectively, more easily and more quickly, this kind of knowledge should be incorporated into CFL/CSL pedagogy. This, combined with training in effective learning strategies, should greatly aid the acquisition of Chinese vocabulary by L2 learners.

CHAPTER 4
CHARACTER STRUCTURE AND WORD STRUCTURE IN NEW WORD RECOGNITION BY L2 LEARNERS

4.1 Research Questions

The psycholinguistic studies discussed in Chapter two have revealed that morphological structure in different languages is represented in the mental process of word recognition of native speakers. The results of Chapter three in this study also demonstrate that both Chinese character radicals and word structure are used by native speakers of Chinese to derive the meaning of an unfamiliar word, and that such knowledge is beneficial to their vocabulary learning.

Nevertheless, since the study of acquisition and pedagogy of Chinese as a second/foreign language is still very young, vocabulary learning strategies of CSL/CFL learners and the pedagogy of vocabulary acquisition have not yet attracted attention. It is not clear what strategies are adopted by L2 learners to acquire Chinese vocabulary, and, compared with native speakers, what differences exist in the acquisition process of CSL/CFL learners. It is generally believed that the knowledge of word structure is automatically acquired by learners themselves in the process of language study. Therefore, currently, the knowledge of character structure and the knowledge of Chinese word structure are seldom introduced in textbooks of CSL/CFL, and as a result, are not incorporated as an important component of classroom instruction. Morphological knowledge, in particular, is almost totally ignored. In fact, however, no research has ever

been done to show that L2 learners of Chinese actually acquire the knowledge of Chinese word structure by themselves. It is also unclear when such acquisition, if it occurs at all, is completed, or if such knowledge is also used by L2 learners of Chinese as a strategy of vocabulary learning.

The present research seeks to answer these questions. Moreover, this study will also try to ascertain if the knowledge of character structure/radicals and word structure can help CSL/CFL learners arrive at the meanings of unfamiliar words as it does for native speakers.

4.2 Research Design

During the years of my CSL/CFL teaching to students at different levels, I have noticed through a longitudinal observation that the knowledge of character radicals and word structure is rarely used by L2 learners in their process of learning Chinese words. This suggests that L2 learners perhaps acquire such knowledge very slowly if it is not taught to them. Since internal behaviors are not directly observable, whether or not L2 learners of Chinese have such knowledge can only be found out indirectly through other research methods. Thus, following the investigation of native Chinese speakers discussed in Chapter three, another investigation, which also includes a survey, a follow-up word test and an interview that has different contents, was designed and completed. The goal of the investigation was to discover what strategies are typically used by CSL/CFL learners in vocabulary learning, and if the knowledge of character radicals and word structure is also helpful to them. These results are analyzed and compared with the results found in

Chapter Three in order to decide whether or not such knowledge should be an important part of the pedagogy of CSL/CFL.

4.2.1 The Survey

First, a survey with twelve questions was designed and presented to participants. The questionnaire was to determine: 1) the proficiency level of each L2 learner, 2) the primary source from which they learn their Chinese vocabulary (i.e. from textbooks, outside reading, or any other source), 3) the strategies used in vocabulary learning, and 4) whether the learner has learned character radicals and word structure through formal instruction. Most of the questions were multiple choice. Some of them, such as the question about learning strategies, were open-ended in order to obtain as many different answers as possible.

A survey is a means of verbal report, so it can obtain information not available through observation. Critics of this research methodology have noted that answers to a questionnaire may not portray an accurate picture of how a participant really does in language learning (Cohen 1998, Chapter 3). For example, participants may report that they have used some learning strategies which, in fact, they did not use; or these strategies are only used in their L1 but not in their L2. On the other hand, some learning strategies involve cognitive processing and are unconscious; thus, participants may not even realize they employed these learning strategies. These are some of the disadvantages of the survey method. In order to assure that the data collected are not only quantitative but also qualitatively sound, other means have to be used as complements.

4.2.2 The Word Test

In addition to the survey, a follow-up word test was designed and presented to the participants in order 1) to double-check the answers of the survey, 2) to find out if L2 learners of Chinese do have the knowledge of character radicals and word structure, and 3) to test if L2 learners of Chinese can also use the knowledge of character radicals and the knowledge of word structure to infer the meanings of unfamiliar words as native speakers do.

There were two parts in the test (see Appendix B). Part A contained eighteen Chinese words listed separately without any context. These test words were either mono-morphemic words or multimorphemic compounds. All the characters of the words consisted of some common radicals, such as 艹 'grass', 氵 'liquid', 足 'foot', 口 'mouth', 犭 'animal' or 鸟 'bird'. The structure of each compound was either a modifier-head type or a parallel one (i.e. noun-noun or verb-verb), both of which are very common and productive word structures in Chinese. Words with the same radical were listed together. Part B contained sixteen test words. These words were arranged in ten separate sentences, and the context provided some information on the meaning of each word. Moreover, character radicals or morphemes also provided some information on the meanings of the test words. None of the test words appear in the first 5000-vocabulary list (i.e. 1,000 for the beginning level, 2,000 for the beginning-intermediate level, and 2,000 for the intermediate-advanced level) of *Han-yu Shui-ping Ci-hui yu Han-zi Deng-ji Da-gang* <<汉语水平词汇与汉字等级大纲>> ('Criteria for Chinese Vocabulary and Characters at Different Proficiency Levels') (1992). In other words, according to the Criteria, the test words are not the required vocabulary before L2 learners of Chinese

reach the higher advanced level. Thus, it was assumed that these words were unfamiliar to the participants. Participants were required to infer the general meaning of each test word without consulting any dictionary and were instructed to put a question mark "?" beside each unfamiliar word.

In order to check whether all the questions were valid, the survey and the test were tried out in a pilot study. Both were revised before they were administered to a larger number of participants.

4.2.3 The Interview

Following the completion of the survey and the test, an interview was devised. Its goal was to discover detailed information about how L2 learners deal with unknown words and to confirm the results of the survey and the test. Except for a few questions, all of the questions of the interview were the same as in the survey and the test. The interviewees were asked to think out loud about how they guessed the meaning of each unfamiliar word. In order to observe whether or not the student might be able to do better when s/he was led to pay attention to character radicals, morphemes and contexts, some leading questions were asked by the interviewer. For example, when an interviewee could not determine on the meaning of a test word, the following questions would be asked: "Do you know the radical of the characters?", "Can you get any hint from the characters you do know?", or "Will you read the sentence again and see if you can get some information from the context?". All the interviews were tape recorded with the permission of the interviewees for subsequent transcription and analysis.

4.2.4 The Participants

Eighty-eight international students participated in the survey and the test. All were studying Chinese as their second/foreign language at three different universities. They were either at the intermediate level (i.e. enrolled in the second-year or the third-year Chinese classes) or the intermediate-advanced level (i.e. junior-advanced level, or in the first semester of the fourth-year Chinese class) of Chinese at the time that the survey and the test were taken. Among them, eighteen were students from a Czech university, 52 were international students from the College of International Culture Exchange of Nanjing Normal University in China, and eighteen were American students who were studying Chinese at the University of Florida (UF). The participants in the interview were nine UF students in their third or fourth year of Chinese language study. The interview was conducted after the survey and the test were completed. Since most of the questions in the interview were the same as those in the survey and the test, none of the interviewees took part in the survey or the test. Thus, all the interview questions were new ones to them and their answers were not affected by anything that might have happened in the survey or the test.

4.3 Results

The results of the survey, the two parts of the test, and the interview were calculated separately. These are presented in the following subsections. The results obtained from the participants with different L1s were also calculated separately in order to ascertain whether or not their learning strategies are affected by their L1s. In order to distinguish the difference between the participants with varying Chinese language levels,

the participants were separated into two groups in the reports: the intermediate level and the advanced level (but not a higher or senior advanced level).

4.3.1 Results of the Survey

Of the 88 participants who took part in the survey, 56 were at the intermediate level and 32 were at the advanced level. They reported their sources of Chinese vocabulary acquisition, their Chinese reading materials, their methods for memorizing new words, and their strategies for dealing with unfamiliar words in their reading. The results are presented in Tables 4.1, 4.2, 4.3 and 4.4.

Table 4.1 Sources of acquired words

Group	Intermediate Level n=56	Advanced Level n=32	Total N=88
Textbooks	46 (82.14%)	22 (68.75%)	68 (77.27%)
Reading	5 (8.93%)	3 (9.4%)	8 (9.1%)
T & R	4 (7.14%)	4 (12.5%)	8 (9.1%)
Dictionary	1 (1.8%)	3 (9.4%)	4 (4.5%)
χ^2 test of the two groups		p=0.293>0.05	

Note: T & R= textbooks and other reading

As shown in table 4.1, the participants reported that they acquired Chinese words mainly from the textbooks they used. Only a few students (8, about 9.1% of the total) reported that they learned words from textbooks and other readings like newspapers or fiction novels. Another eight students reported their vocabulary was acquired mainly from

Table 4.2 Materials of Chinese reading

Group	Intermediate Level n=56	Advanced Level n=32	Total N=88
Textbooks only	44 (78.6%)	8 (25%)	52 (59.1%)
Textbooks and others (newspapers, literature works, etc.)	12 (21.4%)	24 (75%)	36 (40.9%)
χ^2 test of the two groups		$p=8.66 \times 10^{-7} < 0.05$	

their reading outside of class. Dictionaries were also used as a main source of vocabulary learning, but the percentage (4.5%) is insignificant and can be ignored. The results of this survey indicate that L2 learners of Chinese perceive their textbooks to be very important in vocabulary acquisition. Most students, in both the intermediate and advanced levels, believed their newly acquired Chinese words were mainly from their textbooks. The result of a Chi-square test shows that there is not a significant difference between these two groups (the probability of the null hypothesis is larger than 5% and cannot be rejected). Table 4.2 also shows that Chinese textbooks are truly a very important source (if not the main one) from which L2 learners acquire vocabulary, especially when learners are at the intermediate level. Textbooks were reported as reading material by all of the participants, and 78.6% of the students at the intermediate level reported that Chinese textbooks are their only source of reading materials. The result of a Chi-square test shows that the probability of the null hypothesis (i.e. no difference between the test groups) is very small and can be rejected. Thus, the difference between the two groups is significant. This only means that, besides textbooks, the advanced level students read more other materials than the intermediate students did. Even so, textbooks were still their most important reading

materials and the main resource from which they acquired words (68.75%, see Table 4.1). If these results are accurate, the number of vocabulary items introduced, the arrangement of vocabulary and the method and amount of vocabulary practice should be taken into serious consideration in textbook design, especially for students at the intermediate level and above.

Table 4.3 Methods of memorizing new words

	Intermediate Level n=56	Advanced Level n=32	Total N=88
Individual	47 (83.93%)	27 (84.38%)	74 (84.1%)
Morpheme Group	9 (16.07%)	5 (15.62%)	14 (16%)
χ^2 test of the two groups		p=0.95 > 0.05	

Table 4.3 presents the methods used for memorizing new words. Only fourteen students reported that they adopted morphological knowledge to help them memorize new words. The method they used was to group the words containing the same morpheme or characters together for memorization. The other students, however, just memorized each new word individually when they come across one. The result of a Chi-square test shows that there is no difference of strategy use between the two groups (the probability of the null hypothesis is very large and has to be accepted).

According to another report of the survey, all eighteen Czech students and another fifteen students with different L1s and Chinese levels obtained some knowledge of character radicals and Chinese word structure from formal instruction. The fourteen students who used morphological knowledge to memorize new words were among them.

This indicates that providing related knowledge in instruction could enhance students' use of strategies. Through contact with their instructors, it was found that instruction in Chinese morphological knowledge was provided randomly by the instructors; that is, in no systematic manner. Nevertheless, all 33 students thought the knowledge they obtained in such a way was important and helpful in learning Chinese words. If this is true, a systematic instruction in Chinese word structure would work even more effectively.

Table 4.4 Strategies of dealing with unfamiliar words in reading

	Intermediate Level n=56	Advanced Level n=32	Total N=88
Inferring only	7 (12.5%)	5 (15.63%)	12 (13.64%)
Dictionary only	10 (17.86%)	2 (6.25%)	12 (13.64%)
Both inferring and dictionary	38 (67.86%)	25 (78.13%)	63 (71.6%)
Ignore	1 (1.8%)	0	1 (1.14%)
χ^2 test of the two groups		p=0.38>0.05	

Table 4.4 shows that both inferring and the use of a dictionary are strategies used by most students (about 71.6%) when dealing with unfamiliar words. Only 13.64% of the students reported that they would just infer or guess the meaning of unfamiliar words without consulting a dictionary. The same percentage of students reported that they would only use a dictionary. When participants were asked how they inferred the meanings of unfamiliar words, they reported deriving the meanings from information

found in the context or in the character radicals. Because that participants were not familiar with the terminology, morpheme or word structure was seldom mentioned.

Percentages in Table 4.4 also show some differences between the intermediate level group and the advanced level group. The advanced level group tends to use more guessing than the other group. However, when a Chi-square test was performed to check if the differences were significant, the probability of the null hypothesis (no obvious difference between these two groups) is 0.38 and is much larger than 0.05. Thus, the null hypothesis cannot be denied. It suggests that a difference in strategy use of the two groups exists but is not very significant, and that the difference, perhaps, happened by chance.

4.3.2 Results of the Test

There were two parts in the test: Part A contained eighteen test words listed separately and Part B contained sixteen test words placed in sentences. None of the test words were in the first 5000-vocabulary list (the vocabulary except for the fourth level, i.e. the senior advanced level) of *Han-yu Shui-ping Ci-hui yu Han-zi Deng-ji Da-gang* <<汉语水平词汇与汉字等级大纲>> ('Criteria for Chinese Vocabulary and Characters at Different Chinese Levels') (1992), so these words were supposed to be unfamiliar to the participants as originally designed in the test. For one reason or another, however, a few of the test words were unavoidably known to some of the participants, and the number of such words varied with each individual. The answers related to the familiar words were excluded from the statistics and discussion that follow. The statistics only calculate the percentage of unfamiliar words for which the meanings were inferred correctly by each participant. For example, if there were ten words that a participant was

unfamiliar with and five meanings were inferred correctly by the participant, the score of the participant is 50%. A few participants did not mark the familiar and unknown words clearly enough, thus they were excluded from the statistics. Table 4.5 presents the average scores of the students in the intermediate level group and the advanced level group.

Table 4.5 Average scores (percentages) and the T-test properties of two groups

	Intermediate Level n=51	Advanced Level n=26	Total N=77	T-test
Part A	42.43%	47.26%	44.06%	p=0.44
Part B	37.85%	40.28%	38.67%	p=0.68
Total	41%	45.17%	42.41%	p=0.37

Table 4.5 shows that students from both levels can guess the general meanings of some test words, but the average percentages of the two groups are lower than 50% in the test. Since the test words of Part A were listed according to radicals (i.e. the words with the same radical were arranged together), the participants could have been led to pay more attention to the radicals and reach the meanings of the words more easily than otherwise. It could also be assumed that the grades would have been lower if the words had been listed randomly. The numbers in the table suggest that the advanced level group did better than the intermediate level group. However, when the T-test was performed to check the difference, the value of the null hypothesis, i.e. no obvious difference between the test groups, is not small enough to reject the null hypothesis. Therefore, even though the scores of the test do show a difference between the two groups of different language

levels, the difference is not significant in this test. This merely indicates that the students with the higher Chinese level can probably do better in inferring the meanings of unfamiliar words, but such an advantage is not obvious.

Furthermore, Table 4.5 also shows that there is no great difference when test words were listed individually or placed in sentences. As shown in the table, the average percentages of test Part B are even a bit lower than the ones of Part A. It seems that, in this test, context information does not help much for inferring word meaning. The reason for this will be discussed in Section 4.4.

Tables 4.6 and 4.7 present the test results of the students with different first languages (L1) and the properties of an ANOVA test for these groups. In the tables, "South Asian Ls (languages)" refers to Lao, Vietnamese and Malay; "East Asian Ls" means Japanese and Korean, in which Chinese characters are also used; and "Others" refers to German, French, Russian and Mongolian.

Table 4.6 Test results of the intermediate-level students with different L1s and the properties of ANOVA test

L1	English n=16	Czech n=8	South Asian Ls n=7	East Asian Ls n=14	Others n=6	ANOVA N=51
A	49.1%	56.6%	30.56%	32.4%	45.3%	F=0.0973 p=0.983
B	23%	56%	40%	39.4%	48%	F=0.094 p=0.984
Total	37%	57.3%	36%	36.1%	47.4%	F=0.041 p=0.997

Table 4.7 Test results of the advanced-level students with different L1s and the properties of ANOVA test

L1	English n=2	Czech n=10	South Asian Ls n=3	East Asian Ls n=5	Others n=6	ANOVA N=26
A	46%	58%	9.3%	58%	44%	F=0.076 p=0.99
B	50%	54.1%	35%	25.3%	29.2%	F=0.047 p=0.996
Total	46%	54.3%	29%	41.2%	41.1%	F=0.016 p=0.999

As listed in the two tables, the average percentages of the five groups in the test do not show a significant difference. The probabilities of ANOVA test are all more than 0.98. This result suggests that the first languages of the participants do not affect their achievements in inferring the meanings of Chinese words if they are not trained or guided by special pedagogy.

Nevertheless, the tables do show that the average percentages of the Czech group are higher than those of the other groups. If the Czech group is isolated and compared with all the other groups as a whole, the T-test shows that there is some difference between them. The results are presented in Tables 4.8 and 4.9.

In the tables, the value of the null hypothesis (i.e. no difference between the two groups) is quite small. At the intermediate level, the property of the whole test is smaller than 5% ($0.0065 < 0.05$) and the null hypothesis can be rejected. Thus, there is a significant difference between the two groups at the intermediate level. At the advanced level, the property of the null hypothesis is a little larger than the judge level 0.05. Even though the difference is not significant enough to totally reject the null hypothesis, the

numbers, however, still suggest that the chance of the difference is quite huge (about 94.9% in the whole test). The reasons will be discussed in Section 4.4.

Table 4.8 Average percentages and the probabilities of T-test between the Czech group and other groups at the intermediate level

	Czech n=8	Others n=43	T-test N=51
Part A	56.6%	40.1%	p=0.084
Part B	56%	34.5%	p=0.0016
Total	57.3%	38%	p=0.0065 < 0.05

Table 4.9 Average percentages and the probabilities of T-test between the Czech group and other groups at the advanced level

	Czech n=10	Others n=16	T-test N=26
Part A	58%	42.1%	p=0.105
Part B	54.1%	31.6%	p=0.0168
Total	54.4%	39.4%	p=0.0515 > 0.05

4.3.3 Results of the Interview

Nine American students who studied Chinese at the University of Florida were interviewed. Two of them were in a fourth-year Chinese class, which is the advanced Chinese level, and seven of them were in a third-year Chinese class, which is the intermediate Chinese level. The first language of four students is English; of the other five students, it is either Mandarin Chinese or Cantonese (but they could not speak fluently and could not read and write). The results of the interview are displayed in Tables 4.10 to

4.14. Most of the test words were unfamiliar ones to the interviewees. One point was awarded if a correct general meaning was given for a tested word. A maximum of 34 points are allowed in the test, eighteen for Part A and sixteen for Part B.

Table 4.10 Strategies of dealing with an unknown word reported in the interview

	Intermediate Level n=7	Advanced Level n=2	Total N=9
Dictionary only	2 (28.6%)	0	2 (22.2%)
Guessing only	2 (28.6%)	0	2 (22.2%)
Both	3 (43%)	2 (100%)	5 (55.6%)

Table 4.11 Vocabulary sources reported in the interview

	Intermediate Level n=7	Advanced Level n=2	Total N=9
Textbooks	6 (85.7%)	1 (50%)	7 (77.7%)
Other reading	0	0	0
Both	1 (14.3%)	1 (50%)	2 (22.2%)

From the information provided in Tables 4.10, 4.11, and 4.12, it can been observed that the results of the interview match the results of the survey and the test. Students may try to infer the meaning of an unfamiliar word during their Chinese reading, but dictionaries are still necessary. Most of the interviewees, about 55.6% in the interview, reported that they consult a dictionary frequently and infer or guess a word meaning only

Table 4.12 Methods of memorizing reported in the interview

	Intermediate Level n=7	Advanced Level n=2	Total N=9
Individual	4 (57.1%)	1 (50%)	5 (55.6%)
Morpheme group	2 (28.6%)	0	2 (22.2%)
I & M	0	1 (50%)	1 (11.1%)
Context	1 (14.3%)	0	1 (11.1%)

Note: I & M= both individual and morpheme group

Table 4.13 Average scores of the test in the interview

	Intermediate Level n=7	Advanced Level n=2	Total N=9
Part A	7.86 (43.7%)	12.75 (70.8%)	9.2 (51.2%)
Part B	8.4 (52.5%)	12.5 (78.1%)	9.3 (58.2%)
Total	16.3 (47.8%)	25.25 (74.3%)	18.5 (54.5%)

Table 4.14 Average scores of students with different L1s in the interview

	Non-Chinese n=4	Chinese n=5	T-test N=9
Part A	9.4 (52.1%)	9.1 (50.4%)	p=0.926
Part B	9.93 (62%)	8.86 (55.4%)	p=0.7
Total	19.33(57%)	17.96 (52.8%)	p=0.803

when too many unfamiliar words are encountered in a reading or when a dictionary is not on hand. The basis of inferring is the information provided by the context or character radicals. Textbooks are also reported as the main source from which the students learned Chinese vocabulary. Furthermore, except for two students (one at the intermediate level and the other at the advanced level), all the other students reported that their Chinese textbooks were their only reading materials. Most of the students (about 55.6%) merely memorized Chinese words one by one according to the vocabulary list of each lesson in their textbooks. One student said that he memorized new words in the context of sentences. Only two students reported that they accessed their morpheme knowledge to help themselves memorize Chinese words. It happens that these two students were the only ones who reported that they had learned some knowledge of Chinese word structure in other schools (e.g. at a university in Taiwan). Another student at the advanced level, who finished elementary school in Taiwan, reported that she would try to group some words with the same character together to memorize, even though she had no knowledge of word structure.

On average, about 54.5% of test words were inferred correctly in the interview (showing in Table 4.13). The percentage is a bit higher than the one in the test (about 42.4%, see Table 4.5). The reasons will be discussed in Section 4.4. The numbers in Table 4.13 also show that the students in the advanced level did better on the test than the students in the intermediate level. Nevertheless, since only two students of the advanced Chinese level were interviewed, the number size is insufficient to tell whether or not there is a difference between these two groups.

The students whose first language was Chinese may have some advantage in Chinese study. However, Table 4.14 shows that the students who speak Chinese at home did not do any better on the test than the students whose first language was English. The properties of the T-test also indicate that there are no differences between these two groups. The reason could be: 1) the number of the interviewees was quite small; therefore, the result is not very reliable, and more tests are needed to judge the difference; or 2) the students whose first language was Chinese might have some advantages on Chinese grammar, pronunciation and characters, but they probably did not have any advantage in inferring the meanings of unfamiliar words if they had not been trained to use some strategies. More discussion will be presented in next section.

4.4 Analysis and Discussion

The results of the survey, the test and the interview have shown that L2 learners of Chinese sometimes do try to infer the meanings of unfamiliar words while reading. The inferring, however, is not as frequent or as successful as that of native speakers shown in Chapter three. There are also other differences between L2 learners and native Chinese speakers when they deal with unfamiliar words.

4.4.1 The knowledge of Character Radicals and Word Structure

According to the report of the participants, the sources that they inferred the meanings of words from were character radicals and contexts. The results of the test and the interview reveal that L2 learners of Chinese may have some knowledge of character radicals but they lack the knowledge of word structure.

Character radicals are the basic units of Chinese characters and usually indicate the semantic category (i.e. animal, plant, liquid, action, etc.) of a character. Such knowledge is usually introduced as a part of language instruction to native children in primary school. Even though it is not included as an important ingredient in current textbooks of CFL/CSL, many instructors actually teach it in beginning level classes when characters and Chinese dictionaries are introduced. As a result, L2 learners of Chinese do have some knowledge of character radicals and can use it, sometimes to help themselves learn and memorize characters. Such knowledge, however, is acquired in a fragmentary way, as shown by the results of the investigations. For example, in the test and the interview, many students could only recognize some of the character radicals. They knew that 艹 means 'grass', 氵 is 'liquid', and 口 means 'mouth', and the meaning of a character with one of such radicals is usually related to the meaning category the radical marks. Nevertheless, many of them could not guess the meaning of a character with a radical like 犭 ('animal'), 气 ('air'), 饣('food') or 鸟 ('bird'). The unsuccessful inference means that they could not recognize or were unfamiliar with these common radicals. In the interview, when the participants were asked if they knew the meanings of these radicals, many of them gave a negative answer. In fact, they knew many characters with such radicals like 狗 *gou* 'dog', 汽 *qi* 'steam', 饭 *fan* 'rice, meal, food', 鸡 *ji* 'chicken', but they did not make an effort to isolate the radicals. This indicates that the radical knowledge the students acquired is not sufficient. Thus, a systematic instruction of character radicals seems to be necessary in Chinese language classes.

The results of the investigation also revealed that many students did not have much knowledge of word structure. Except for the modifier-head structure, a very common and

universal one, the others were unknown to most of the participants. When a parallel compound came up, many participants could not infer the meaning even when one or two of the morphemes were familiar to them. For example, in the interview, some participants could not reach any meaning of the parallel compounds 吞 咽 *tun-yan* [swallow-swallow] 'swallow' and 吮 吸 *shun-xi* [suck-suck] 'suck'. Actually, they knew the meaning of one of the two morphemes in each compound and the radical 口 ('mouth'), but they could not figure out that the meaning of the compound is similar to the meaning of a component. This implies that the students were unfamiliar with this kind of word structure.

As discussed in Chapter 3, the native speakers with an educational level of junior middle school received the lowest average scores in the test. One reason for this is that they probably lack sufficient knowledge of word structure. Therefore, it is assumed that, in a natural language-learning environment, the knowledge of word structure is totally acquired after a speaker reaches the educational level of middle school. In this chapter, investigations have found that there is no obvious difference between the students of different language levels. The participants of the advanced level did not show that they could do better than the students of the intermediate level in strategy use and in inferring word meaning. They also did not show that they had more knowledge of Chinese word structure. These facts suggest that the knowledge of Chinese word structure is probably acquired after L2 learners reach the advanced level of Chinese language (perhaps at the senior advanced level), if no instruction and training of such knowledge is given. If this is true, then, for a long time, L2 learners cannot take the advantage of Chinese word structure to help them learn Chinese vocabulary quickly. They would waste a lot of time groping around for this useful knowledge and some of them may never acquire it. Thus,

to speed up the process of Chinese vocabulary acquisition, instruction in Chinese word structure is needed urgently in Chinese pedagogy.

Other results of the investigation also demonstrate that instruction in Chinese word structure is beneficial to vocabulary study. In the survey, the participants who had acquired this knowledge all reported that it was very helpful to their vocabulary learning. Many of them also reported that they had used this knowledge to help themselves memorize new words. According to reports from the students and the instructor, the Czech participants in the investigation had been taught some aspects of Chinese word structure. Tables 4.8 and 4.9 show that the average test grades of this group were higher than those of other groups, especially when the students were at the intermediate level. The result of the T-test also shows that there was some difference between this group and the others. If the higher grade was the result of the instruction in Chinese morphology, it can be safely concluded that a systematic introduction of Chinese word structure and a related strategy-training will contribute to the vocabulary acquisition of L2 learners.

4.4.2 Strategy Use

As shown in Chapter 3, it was found that native speakers of Chinese can get the meaning of an unfamiliar word from the character radical(s), the word structure and the contextual information. Therefore, their inferring is more successful, especially when the word is placed in a context. From the interviews of L2 learners of Chinese, it has been observed, however, that L2 learners mainly depend on one kind of information, either contextual information or character radical information, but not on both, to infer the meaning of a word. They seldom draw on all available information. Because of this, the information which can be consulted is limited and usually insufficient for arriving at the

meaning. The following are some examples. In Part A of the test, both character radicals and word structure (morphemes) are available to provide clues to the meaning of each compound. From the modifier-head structure, the participants knew that 茅草 *mao-cao* (cogonggrass-grass, 'cogongrass') is "a kind of grass", 菊花 *ju-hua* (chrysanthemum-flower, 'chrysanthemum') is "a kind of flower", and 橡树 *xiang-shu* (oak-tree, 'oak') is "a kind of tree". However, if the head was unfamiliar, the students usually could not reach any meaning, even though the radical also provides a clue. Thus, the meanings of 香蕉 *xiang-jiao* (fragrant-banana, 'banana'), 橄榄油 *ganlan-you*, (olive-oil, 'olive oil') and 馄饨汤 *huntun-tang* (huntun-soup, 'Huntun soup') were not correctly inferred by many interviewees because the heads were unfamiliar. Actually, if they had noticed the radicals 艹 ('grass'), 木 ('wood'), 饣 ('food') and 氵('liquid'), they at least would have known that these compounds might be a kind of plant, a food or a liquid. Similarly, when they were doing Part B of the test, the interviewees frequently only noticed some bits and pieces of the information provided by the context or by the radicals. They rarely realized that the meaning of a word could be traced through the trio of context, radicals and word structure. Here are some of the sentences in Part B, as examples:

1. 这两天总是下雨，空气很潮湿.
   zhe liang tian zong-shi xia-yu, kong-qi hen chao-shi
   This two day always rain, air very wet/humid
   'It has been raining these days, and the air is very humid.'

2. 我的自行车轮子没有气了，得去打气.
   wo-de zi-xing-che lun-zi mei-you qi le, dei qu da-qi
   My bike wheel have not air LE, have to go hit-air.
   'My bike got flats, and I have to pump them up.'

3. 我的电脑装了视窗－95 软件。
wo-de dian-nao zhuang le shi-chuang jiu-wu ruan-jian
my computer set LE view-window-95 soft-piece
'In my computer, the Windows-95 software has been installed.'

Two students in the interview guessed incorrectly that the meaning of "潮 湿" *chao-shi* was 'cloudy'. They knew that the sentence was about 'rain', but they did not notice the radical 氵('liquid') and the word "空 气" ('air'). Three interviewees understood that the morphemes of the word "打 气" in sentence two were "hit-air", but they could not infer the meaning of the entire compound. The reason was that they did not notice the information in the context, even though they had read the two coordinate sentences and understood the meaning of the first one. Moreover, while guessing the meanings of the compounds in sentence three, one interviewee thought that "视窗" (view-window, 'window in computer') was 'cost' and "软件" (soft-piece, 'software') was 'money' because she only noticed the number and knew it is about computers. Another one thought that "视窗" was 'monitor' and "软件" was 'material' by merely noticing the morphemes. Another four students could not reach any meaning of these two compounds. In fact, all of them knew the morphemes, but they did not combine the information of the morphemes and the contexts together to infer the meanings.

When the participants merely use one kind of information in the inference, more available information was not more helpful to them and thus, was not related to more success. Thus, the test scores of Part B received by participants are not higher than the scores of Part A (see Tables 4.5 and 4.13). Not using as many clues as possible in tracing word meanings is also a reason why the inference of CSL/CFL learners is less successful than that of native speakers.

Sometimes, the interviewees were led by the interviewer to pay attention to all of the information provided by contexts, morphemes and radicals. In those cases, most of them were able to reach the right answers they had not been able to infer the first time around. Thus, the average scores of the interviewees in the test were higher than those of the other participants. This indicates that the inferring performance of L2 learners should be more successful if they are provided some training and guidance.

Furthermore, as reported in the survey, the method used by the majority of the students for memorizing new words is to work on each word individually. This means that Chinese words in the learners' minds are still separate items and are not connected by radicals, morphemes, or semantic content as a network. As a result, vocabulary acquisition is an overly arduous task to the learners, and they have to spend an excessive amount of time memorizing and learning each word. The facts speak loudly and clearly that L2 learners of Chinese are in dire need of strategy training in order to acquire Chinese words more effectively.

4.4.3 Difference or Non-difference

The results of the investigations show that there is probably a slight difference between the participants of different language levels. For example, more participants at the advanced level reported that they also read other Chinese materials besides their textbooks, and fewer of them only used dictionaries to find the meanings of unfamiliar words (see Tables 4.2 and 4.4). Moreover, the average test scores of the participants at the advanced level were a slightly higher than those of the students from the lower level (see Table 4.5). Nevertheless, the difference is not significant, as shown by the results of

the Chi-square test and the T-test (see Tables 4.4 and 4.5). More investigations are needed to validate the existence of such a difference.

L2 learners with different first languages may use different learning strategies when they study a foreign language. The results of the investigations in this study, however, do not show an obvious difference between the participants with different L1s when they were dealing with Chinese words. For example, except for the students who had gained some knowledge of Chinese word structure, all the other participants mostly memorized new words individually. In the test, except for the Czech group, who had some knowledge of word structure, the average scores of other groups were similar (see Table 4.6). It was found that Japanese students knew more test words than other participants, but they did not show they could do better when they inferred the meanings of unfamiliar words. In fact, the numbers in Table 4.6 suggest that the students whose first languages were western languages probably did slightly better than the students whose L1s were other Asian languages. The learners whose first language was Japanese or Korean, which also uses some Chinese characters, may have some advantages in the study of characters and some basic vocabulary. However, if they were not taught and trained to use some of the strategies, they could not do better in inferring the meanings of unfamiliar Chinese words. Similarly, results of the interview show that the students whose first language was Chinese did not do better in the test either (see Table 4.14). One of them, who was in the advanced level group, did use a special strategy to find the meaning of a test word. The strategy was to find the approximate pronunciation of the word. When she was asked to infer the meaning of a word, she usually used the phonetic component of a character to get its pronunciation. If the sound matched a word in her

spoken Chinese, she would know what the word was. If the phonetic component was not helpful or if the test word was totally unfamiliar to her (i.e. she had not heard it or used it in her spoken Chinese), the inference was usually unsuccessful. Certainly, students who can speak some Chinese will have some advantage studying the language, and they usually can do better in the acquisition of Chinese vocabulary as well as pronunciation and grammar, especially when at the beginning level. However, this does not necessarily mean that they also have more knowledge of character radicals and word structure and can do better in using this knowledge to infer the meaning of a word. The results of the investigations suggest that the knowledge of character radicals, the knowledge of Chinese word structure, and strategies of inferring the meaning of unfamiliar words should be taught to all the L2 learners, no matter what their first languages are.

4.5 Conclusion

From the results of this series of investigations, the following conclusions can be drawn:

1. The Chinese vocabulary that L2 learners acquired is mostly from their textbooks, even when the learner is at an advanced Chinese level and can read other materials. Therefore, vocabulary arrangement and practice should play a very important part in textbook design.
2. The main method of studying Chinese vocabulary that learners use is merely memorizing words individually. In the investigation, students at an advanced level, who had longer study experience, also did not show that they could use some effective learning strategies. In such cases, strategy training is urgently

needed in Chinese language instruction in order to help learners acquire Chinese vocabulary more effectively.

3. The L2 learners participating in the investigation did have some knowledge of Chinese character radicals and, sometimes, were able to adopt it into their vocabulary learning. Such knowledge, however, was insufficient. In addition, they needed the knowledge of Chinese morphology and also lacked the skills of integrating different kinds of knowledge to reach the meaning of unfamiliar words. Due to all these reasons, the inference that L2 learners performed to get the meanings of Chinese words was usually unsuccessful. Thus, a dictionary was still frequently needed, even when the learner was at an advanced level. All this strongly argues that the instruction of Chinese radicals and word structure should receive a lot more attention than it currently does in the CSL/CFL classroom.
4. The results of the investigations into both native Chinese speakers and L2 learners suggest that the total knowledge of Chinese word structure is acquired very late (i.e. after middle school or the advanced Chinese level) in a natural acquisition process. On the other hand, such knowledge has been shown in this study to be very useful for vocabulary recognition and acquisition. All the students who had been taught to acquire such knowledge reported that it was helpful. These students also did better in the test than the other students. As a result, it can be assumed that the instruction of Chinese word structure can speed up vocabulary acquisition of L2 learners.

5. If the first language of a learner is an Asian language, it may be helpful in learning Chinese characters and grammar at the beginning level. However, it is not shown in this study that it is also helpful to inferring the meanings of unfamiliar words. This indicates that the knowledge of Chinese word structure and the strategies of using different types of knowledge to reach the meaning of a word cannot be transferred from the first language of a learner. Formal instruction should teach all CFL/CSL learners such knowledge and strategies.

Lexical inferring is a very important skill strongly encouraged by many SLA researchers for reading and vocabulary learning. It has been found that such a skill results in high rate of vocabulary memory (Bensoussan 1992, Hulstijn 1992, Scherfer 1993). In English as a Second Language (ESL), word meaning is mainly inferred from contexts, and sometimes, by affixes and word structure. Such inferring is often not successful because of insufficient consulted information. In Chinese, however, meaning inferring can be more helpful and successful, since the character radicals, word structure and context can all provide information on the meaning of a word. It has been shown in Chapter three that a native speaker of Chinese with high language proficiency is usually very successful in inferring the meaning of an unfamiliar word by consulting the information from context, word structure, and character radicals. The more information presented, the more accurate the inference is. In this chapter, it was found that L2 learners of Chinese, however, were not very successful in such inference even when they were at an advanced Chinese level. The reason is that they did not have sufficient knowledge of character radicals and word structure and could not take advantage of the various types of information to reach the meaning of a word. Moreover, it seems that Chinese

morphological knowledge can only be acquired very slowly after learners have reached the advanced level if no formal instruction is offered. Studies of SLA have found that formal instruction and strategy training will not affect the stages of a language acquisition process, but they will accelerate the progress and speed up the process at each stage. It has also been found by Cheng (1998) that the instruction of Chinese character radicals can shorten the stages in character acquisition. Thus, it can be concluded that the vocabulary acquisition of CFL/CSL learners will also be accelerated through the teaching and training of related knowledge and strategies.

CHAPTER 5
CHINESE WORD STRUCTURE (I) --- SIMPLE WORDS

Previous chapters have revealed that knowledge of word structure is very important in Chinese vocabulary acquisition and that it can help L2 learners study Chinese words effectively. Many current works have studied Chinese word structures through the theoretical framework of morphology and syntax. They have sought to explain Chinese word structure by different linguistic theories. Most of the results, however, cannot be applied directly to language pedagogy. In order to provide general rules of Chinese word structure for vocabulary teaching and learning, this chapter and the next two chapters will present features of Chinese words, such as structural patterns and semantic characteristics, that are directly applicable to pedagogy. Chapter Eight is an illustration of how these features can be applied.

5.1 Current Studies in Chinese Word Structure

5.1.1 The Definition of Chinese Word

The definition of "word" has always been unclear in linguistic study, and it has been hotly debated. From the "minimum free form" of Bloomfield (1933, p.178) to "the union of particular meaning with a particular complex of sounds, capable of a particular grammatical employment" (Taylor 1990, p.146), linguists have tried to define the concept of 'word' in terms of syntactic functions, phonological features and/or morphological structures. There has not been any generally accepted criterion for word-hood, because

the answer set from any one criterion is not identical to the answer set from any other one. The definition of the Chinese word is even fuzzier because word boundary is not marked in its writing system. The boundary between morpheme and word also varies with styles (e.g. classical vs. modern, written vs. colloquial) and with geographical or social dialects. In classical Chinese, most words are monosyllabic, and nearly each character is a word. Therefore, the 'character' (字 *zi*) is the unit of lexical study in traditional Chinese linguistics. In modern Chinese, however, words tend to be disyllabic and the 'character' and the 'word' (词 *ci*) are no longer the same and must be distinguished. 'Character' now refers to the monosyllabic written symbols and 'word' is generally defined as "the smallest unit which can fill the place of certain functional frames" (Chao 1968, p.160-161) or the smallest unit which can be used freely (Fu 1985, Chapter 1; Chen 1994, p.9). Chinese linguists also use phonological and semantic criteria to identify 'word': word boundaries can be identified by potential pauses (Chao 1968, p. 151; Liu 1990a, p.35), and each word has a fixed meaning and a phonological form (Fu 1985, p.1-6; Chen 1994, p. 10-11). Such definitions, however, still do not cover all the words in Chinese language. For example, Chinese interjections and modal particles such as 啊 *a*, 呵 *he*, 哦 *o*, 喔 *wo*, 噢 *ao*, 哇 *wa*, 吧 *ba*, 嘛 *ma*, do not fit in any of the definitions above. These forms do not have any specific syntactic function nor can they "fill the place of certain functional frames."[1] Modal particles cannot even be used freely but have to be attached to the end of a sentence, though they do contribute some semantic sense for the sentence in which they

Note: 1. In fact, these forms may well serve many functions in discourse. It is not that they cannot fill the functional frames but that the functional frames are not defined well enough in most approaches. See, for example, Chu (1998, Chapter 4).

occur. Dai (1992, 1998) argues that word should have a three-fold definition, i.e. in terms of syntax, phonology and morphology. To him, "a syntactic word is a minimal constituent to which syntactic rules may refer; a phonological word is a certain prosodic domain in which internal phonological rules may apply; and a morphological word is a maximal domain in which morphological rules may apply" (Dai 1992, p.15-16). This definition is useful in the linguistic study of the three areas. But, on the other hand, it makes the problems too complex to be directly adopted for purposes like language pedagogy. According to Dai's definition, 我 们 *wo-men* (I-plural, 'we') is a single word phonologically and morphologically; but it consists of two syntactic words because 们 *men* ('plural for human') has an independent syntactic function, even though it is always attached to a noun or pronoun. Moreover, some common phrases would also become 'words' by Dai's definition. For instance, he would analyze 你 好 *ni hao* ([you good] 'hello'), a fixed expression, as two syntactic words (i.e. subject and predicate), a single phonological word due to its tone sandhi (i.e. the tone of the first syllable is changed from a curved tone to a raised one by the affection of the second tone), and a morphological word due to its single meaning which is not directly derivable from its components. In such a case, the word-hood of Chinese would become even fuzzier. Yip (1992) analyzes the prosodic, syntactic, and semantic properties of Chinese words and finds: 1) the X, XX rhythm (X is one mononym) or YY|Y syntactic structure (Y is a mononymic unit) is for words and the Y|YY syntactic structure is for phrases, 2) a grammatical class can be intrinsically assigned to a word, and 3) a word "refers to a discrete object (or category) or a distinctive property in the real (or imaginary) world" (Yip 1992, p. 60). She suggests that if a unit of expression complies with all of those three requirements, it must be a

word; and that if it meets one or two out of the three, it is probably more of a word than a non-word, or it is a word in one case and is a non-word in another case. Since language is not a perfectly designed and rigid pattern, Yip argues, "it seems particularly unnecessary to argue over a certain unit of expression whether it is a word or an idiomatic phrase if consensus to its meaning or usage is obtained" (Yip 1992, p. 61).

This study discusses the general properties of Chinese words, i.e. the structure types, meaning properties and syntactic functions, which can be applied to Chinese vocabulary pedagogy. In such a case, a general definition of 'word' is given here as the smallest meaningful unit which can fill the functional frame of a typical syntactic structure. Such a unit can either be used independently or be bound inside a sentence to express a meaning. Meaning here refers to a semantic, a pragmatic or a syntactic meaning. Particles, prepositions (coverbs), auxiliaries and conjunctions, which are called "expletives" (虚 词 *xu-ci*) in traditional Chinese syntax, usually have fixed pragmatic or syntactic meanings and occupy a small part of Chinese vocabulary. These words will not be discussed here. Nouns, pronouns, verbs, adjectives and adverbs, which are termed as "full words" (实 词 *shi-ci*) in traditional Chinese syntax, will be the main subject of this study.

5.1.2 Previous Works on Chinese Words

There are quite a few interesting and significant works on Chinese words. One type is a description of Chinese words, such as *Han-yu de Gou-ci-fa* 汉 语 的 构 词 法 (Chinese Morphology) (Lu, 1964), A Grammar of Spoken Chinese (Chao 1968), Mandarin Chinese: A Functional Reference Grammar (Li and Thompson 1981), *Han-yu Yu-fa* 汉 语 语 法 (Chinese Grammar) (Dow 1983), *Xian-dai Han-yu Ci-hui* 现 代 汉 语

词汇 (Vocabulary of Modern Chinese) (Fu 1985), *Han-yu Miao-xie Ci-hui-xue* 汉语描写词汇学 (Chinese Descriptive Lexicology) (Liu 1990a), and *Han-yu Ci-fa Lun* 汉语词法论 (A Study of Chinese Morphology) (Chen 1994). In Chao's work, Chinese word formation and syntactic properties are described thoroughly from Chapter Three to Chapter Six. This work has become the foundation for and the most important reference in all the later studies. All the works mentioned above have presented details of the Chinese word patterns. They, however, describe details to the exclusion of general principles. Thus, further study is needed to generalize such details in order to apply the results to vocabulary pedagogy. Moreover, such works focus either on the syntactic categories and functions of Chinese words (e.g. Li and Thompson 1981, Dow 1983, Fu 1985), on social styles (i.e. classical words, idioms, foreign words, etc. as in Liu 1990a) or on rhetorical meanings (e.g. Liu 1990a, Chen 1994). Some other important features of Chinese words, such as their semantic combinations and the fixed meanings of different word patterns, have not been touched upon. In these areas, more research and descriptions should be developed.

The second kind of previous study is morphological and syntactic research on Chinese words. Such works usually adopt different morphological and syntactic theories or approaches to explain the properties of Chinese words. There have been two primary themes among these discussions. The first one is that the rules of Chinese word structure are related to those of syntactic structures and can be explained by syntactic principles. For example, Qi (1992) claims that all Chinese words are monosyllabic and that polysyllabic words do not exist; therefore, morphological study cannot be applied to Chinese words, and the way of combining monosyllabic words into polysyllabic phrases

can be explained exclusively by Syntax. Tang (1994) argues that Chinese compounds are syntactic islands, and that word-syntax and sentence syntax are one and the same because both sentences and compound verbs in Chinese have internal and external arguments. Therefore, "sentence-syntactic rules and principles extend to apply in the domain of word-syntax as well in all unmarked cases" (Tang 1994, p. 495). Ross (1985) distinguishes Chinese compounds in two types: lexical compounds and phrasal compounds. "Lexical compounds are indivisible words formed in the lexicon, while phrasal compounds are sequences of words joined by syntactic phrase structure rules"(Ross 1985, p. 20). Dai (1992, 1994) claims that Chinese morphology is an inflectional one and is determined by or accessible to syntactic rules. Both Li (1990) and Zou (1994) contend that Chinese V-V compounds are governed by the Case Theory of the Government-Binding Theory of syntax. The second theme of those studies is that complex Chinese words have their own properties different from those of phrase structure. For instance, Liu (1990b) argues that only derivative words and derivational rules can work on the basis of syntactic principles and that morpheme orders and semantic relationships of word components can only be studied by morphological theories. Several other studies apply morphological theories to Chinese and discuss whether Chinese compounds are right-headed (Packard 1990, Starosta et al. 1998) or headless (Huang 1998), and whether Chinese word formation is level-ordered (Packard 1990) or not (Sproat & Shih 1993).

The two themes above represent opposite views in morphological study: the view that word structure should be explained by syntactic theories versus the view that word structure has its own properties. Each view is based on some phenomena and features of words but not on the whole inventory of the language. In fact, a word is the meaningful

linguistic unit that is smaller than a phrase but larger than a morpheme, and it is the element between a phrase and a morpheme. Word structure thus has the properties of syntax, especially in modern Chinese, a language where more than half of the lexical items are compounds. At the same time, words are not equivalent to phrases and they may have purely lexical features which cannot be explained by syntactic rules. For example, in modern Chinese, reduplications and Root-Affix (prefix, infix or suffix) words cannot be explained simply by syntactic headedness theory (see Sections 5.2.2 and 5.2.3). Even in compounds, some properties may be more morphological than syntactic (see Chapter 6.4). In this dissertation, not only will the general word properties similar to those of phrase structures be presented, but the lexical features of Chinese words will also be discussed.

The third kind of previous studies concerns specific types of Chinese words. These studies analyze syntactic or semantic features of different word categories. Topics include the cognitive discussion of a few specific Chinese classifiers (Yau 1988, Tai 1994) and certain morphemes (Liu 1992), the grammatical functions of Verb-Complements (Teng 1977, Yong 1995) and Adjective-Noun constructions (Wang 1995), verbalization and nominalization of Chinese words (Chan & Tai 1994, Tai 1997), word categories and sub-categories (Hu 1996). As some of the findings of these studies can be relatively easily applied to Chinese pedagogy, they will be incorporated into this research directly.

5.2 Types of Chinese Words

There are four major types of Chinese words: mono-morphemic words, reduplications, Root-Affix, and Root-Root compounds. Besides, abbreviations can also

be regarded as a special type of Chinese words. They are discussed in the remainder of this chapter and in the next chapter.

5.2.1 Mono-morphemic Words

There are two kinds of mono-morphemic words in Chinese: monosyllabic and polysyllabic.

Monosyllabic words are traditional Chinese words. Most of them appear frequently in different language materials of modern Chinese. According to *Xian-dai Han-yu Pin-lu Ci-dian* 现代汉语频率词典 (A Word-Frequency Dictionary of Modern Chinese) (Wang 1986), of the top 1,000, 2,000 and 9,000 frequently used words, there are 565, 957 and 2,400 monosyllabic words, respectively. Liu, J. (1990) found that among the most frequently used 300 Chinese words, 75.7% of them are monosyllabic. Moreover, nearly all of the particles, prepositions, pure classifiers/measure-words (i.e. the words only used as classifiers/measures-words) and most of the adverbs are monosyllabic.

A monosyllabic word is a meaningful lexical item which cannot be further decomposed in Chinese and has to be presented as a whole in the mental lexicon. Since monosyllabic words are used in modern Chinese very often, and because these words can also be used as morphemes in other words, they should be the basic vocabulary of L2 learners. Generally, L2 learners of Chinese have to acquire monosyllabic words one by one in language contexts and environments. Chapter Seven will analyze the cognitive meanings of Chinese classifiers---which are all monosyllabic words---in order to help learners understand them easily. Chapter Eight will discuss how to help L2 learners of Chinese study monosyllabic words effectively by instruction in character properties (i.e.

the character structure and development, the radicals) and the training of memorizing strategies.

Polysyllabic mono-morphemic words can also be divided into two types: traditional Chinese words and transliterations. Traditional polysyllabic mono-morphemic words are rare but exist. These words have appeared in Chinese vocabulary for hundreds or even thousands of years. Many of them are the names of some insects and plants and their characters are usually morphemic-phonetic ones; that is, one component marks the pronunciation, and the radical marks the meaning category (e.g. insect, plant, etc.). For example, 蜻蜓 *qingting* 'dragonfly', 蜘蛛 *zhizhu* 'spider', 芙蓉 *fuyong* 'cottonrose hibiscus; lotus', 茉莉 *moli* 'jasmine'. There are also some verbs or adjectives, such as 唠叨 *laodao*, 'be garrulous', 峥嵘 *zhengrong* 'lofty and steep', but these are the words that occur in Chinese with low frequency. Some of these words, such as 苜蓿 *muxu*, 罂粟 *yingsu*, and 葡萄 *putao*, may also be transliterations. Since they have been used in Chinese for a long time, it is unclear which languages they were borrowed from.

Polysyllabic transliterations are quite common in modern Chinese. The characters of these words just represent the syllabic pronunciations and do not have anything to do with their original meanings. Some of the words were introduced into the Chinese language hundreds of years ago. For example, 胡同 *hutong* 'lane; alley' was borrowed from Mongolian in the Yuan Dynasty (1279-1368 A.D.). But many of them came into Chinese in the 19th or 20th century. Most of the transliterations in modern Chinese are nouns, i.e. the names of places, people, instruments or proper nouns. A few of them are adjectives. For instance:

澳大利亚 *aodaliya* 'Australia'　　华盛顿 *huashengdun* 'Washington'

克林顿 *kelindun* 'Clinton'

摩托 *motuo* 'motorcycle'　　的士 *dishi* 'taxi'

马拉松 *malasong* 'Marathon'　　奥林匹克 *aolinpike* 'Olympic'

幽默 *youmo* 'humorous; humor'.

None of the polysyllabic mono-morphemic words are decomposable. Therefore, their meanings cannot be reached through word structures and characters. But L2 learners can get their meanings from context, phonetic radicals of characters and pronunciations marked by characters. Moreover, since most of these words are nouns, i.e. the name of an insect, a plant, a place, a person or an instrument, it should not be hard to infer the meanings of the transliterations from context. Learners can also use character radicals and pronunciations to help them memorize these words.

5.2.2 Reduplications

In modern Chinese, many nouns, measure words (classifiers), action verbs and state verbs (adjectives) can be reduplicated to form new meanings. Chinese reduplications have been discussed in Chao (1968) and a few other works, but none of them point out that the reduplicated patterns and their semantic meanings are rule-governed, nor do they list the general rules. In order to help L2 learners of Chinese understand reduplicated words and know how to use reduplications easily, the rules of reduplicate patterns are generalized and given below.

(1) Nominal Reduplications

A. In modern Chinese, all monosyllabic measure-words (MW)/classifiers and all monosyllabic nouns that can be used as measure-words contingently can be reduplicated. The meaning of such reduplication is 'every N'. For example:

个 个 人 *ge-ge ren* [MW-MW person] 'every person'

次 次 访 问 *ci-ci fang-wen* [MW-MW visit-ask] 'each visit'

天 天 *tian-tian* [day-day] 'every day'

人 人 *ren-ren* [people-people] 'every person'

Except for a few words (such as 字 *zi* 'character', 月 *yue* 'month', and 事 *shi* 'thing'), monosyllabic nouns which are never used as measure words (i.e. cannot be used directly after a number and before other nouns) in general cannot be reduplicated. Some nouns may be used after 一 *yi* 'one' to mean 'N full of …'. For instance: 一 手 油 *yi-shou you* [one-hand oil] 'oil (is) all over the hand'

B. Parallel compounds which refer to locations can be reduplicated as N1N1N2N2 type (N1 and N2 are the two components, which are antonyms, of a compound) to emphasize 'every N1 and N2' or 'all of N1 and N2'. For example, 里里外外 *li-li-wai-wai* [inside-inside-outside-outside] 'all of the inside and outside', 前前后后 *qian-qian-hou-hou* [front-front-back-back] 'all of the front and back', 左左右右 *zuo-zuo-you-you* [left-left-right-right] 'all of the left and right'. A few other compounds with a similar structure occur, but the pattern is not productive. Examples are 男男女女 *nan-nan-nu-nu*, [man-man-woman-woman] 'every man and woman', 花花草草 *hua-hua-cao-cao*, [flower-flower-grass-grass] 'different (kinds of) flowers and grasses', 日日夜夜 *ri-ri-ye-ye*, [day-day-night-night] 'each day and night'.

C. Kinship terms are usually reduplicated but the reduplication does not change their meanings. Both the monosyllabic forms and the reduplicates are acceptable, especially those for members of the immediate family. For example, 爸 *ba* 'pa', 爸爸 *ba-ba* 'dad'; 妈 *ma* 'mom', 妈妈 *ma-ma* 'mom'; 爷 *ye* 'grandpa', 爷爷 *ye-ye* 'grandpa'; 哥 *ge* 'elder brother', 哥哥 *ge-ge* 'elder brother'.

(2) Reduplications of Action Verbs

In modern Chinese, all monosyllabic action verbs and disyllabic verbal compounds with parallel structure (i.e. the two components are equal and are synonyms or antonyms) can be reduplicated to mean 'try to V' or 'V a little'. For example:

吃 *chi* 'to eat' → 吃吃 *chi-chi* 'try to eat, eat a little'

看 *kan* 'to look at, to watch, to read' → 看看 *kan-kan* 'just watch/read a little'

整理 *zheng-li* 'to tidy up' → 整理整理 *zhengli-zhengli* 'to clean a little'

推敲 *tui-qiao* [push-knock] 'to weigh; to deliberate' → 推敲推敲 *tui-qiao-tui-qiao* 'to weigh a little; to deliberate a little'.

To highlight the attemptive meaning 'to try', such reduplications can have the verb 看 *kan* 'look' added to them to become VV看. E.g. 吃吃看 *chi-chi-kan* 'to try to taste'; 整理整理看 *zhengli-zhengli-kan* 'to try to clean'.

(3) Reduplications of State Verbs (or Adjectives)

Some state verbs (adjectives) for such notions as colors, tastes, temperatures and feelings (i.e. cold, warm, hot, cool, glad) can be reduplicated.

A. When a monosyllabic state-verb is reduplicated, a particle 的 *de* can always be added after the reduplication in sentences. Such reduplications are termed 'Vivid

Reduplicates' by Chao (1968, p. 205). That is, they are used to vividly describe some features. For example:

红 *hong* 'red' → 红红(的) *hong-hong (de)* 'reddish'.

高 *gao* 'high, tall' → 高高(的) *gao-gao (de)* 'highish'

甜 *tian* 'sweet' → 甜甜(的) *tian-tian (de)* 'sweetish'

累 *lei* 'tire' → 累累(的) *lei-lei (de)* 'tiredly'

B. A disyllabic state-verb (adjective) AB can be reduplicated as AABB or ABAB. The AABB pattern is only for disyllabic parallel-compounds. If the two components of a parallel compound, A and B, are synonyms, the reduplication AABB means 'very A and B'. For instance:

清楚 *qing-chu* [clear-clear] 'clear' → 清清楚楚 *qing-qing-chu-chu* 'very clear'

奇怪 *qi-guai* [strange-weird] 'weird' → 奇奇怪怪 *qi-qi-guai-guai* 'very weird'

If the two components A and B are antonyms, the reduplication means 'some are A, and some are B'. For example:

高低 *gao-di* [high-low] 'high and low' → 高高低低 *gao-gao-di-di* 'some are high, some are low'

明暗 *ming-an* [bright-dark] 'bright and dark; obvious and hidden'

→ 明明暗暗 *ming-ming-an-an* '(some are) obvious and (some are) hidden'

The ABAB type is usually for Modifier-Head compounds to intensify features being described. Examples are:

金黄 jin-huang [gold-yellow] 'golden yellow'

→ 金黄金黄 *jin-huang-jin-huang* 'very very yellow'

冰冷 bing-leng [ice-cold] 'as cold as ice'

→ 冰冷冰冷 *bing-leng-bing-leng* 'very very cold'

Many parallel compounds and some other compounds that indicate states of the mind or feeling (e.g. "happy, glad, angry, sad, nervous, headache, jealous, understand"), may also be reduplicated in the ABAB pattern. Such reduplication is often used in a causative sentence to mean 'to cause X to become AB' or a contingency sentence. E.g.: 明白 *ming-bai* [clear-white] 'understand' → 让他明白明白 *rang ta ming-bai-ming-bai* [let he clear-white-clear-white] 'to let him understand'. 开心 *kai-xin* [open-heart] 'to be happy' → 你能不能开心开心 *ni neng bu neng kai-xin kai-xin* [you can not can open-heart-open-heart] 'Can't you be happy?'. An exception is that a Modifier-Head compound 高兴 *gao-xing* [high-mood] 'happy, glad' is treated as a parallel compound when it is reduplicated. When it is in the AABB pattern, it means 'very happy, very glad'; when it is in the ABAB pattern, it is 'to become happy'. For example:

我高高兴兴 地 给他一件礼物.
Wo gao-gao-xing-xing de gei ta yi jian li-wu
I very-happy Particle give he one MW gift
'I give him a gift very gladly.'

我买件礼物给他, 让他高兴高兴
wo mai jian li-wu gei ta, rang ta gao-xing-gao-xing
I buy MW gift to he, let he become-happy
'I will buy a gift for him and let him be happy.'

Since all adjective reduplications have the meaning of increasing the degree of a state or feature, they cannot be further modified by other degree adverbs like 很 *hen*, 'very', 非常 *fei-chang*, 'extremely', and 有点 *you-dian*, 'a little/bit'.

5.2.3 Affixes

Like other languages, Chinese has prefixes, infixes and suffixes. Infixes are very few in number and mostly serve some phonological functions but do not have any semantic meanings. Most of the prefixes and suffixes in Chinese are attached to nominals, only a few of them are attached to verbs. The meanings and functions of Chinese affixes are governed by general rules, and many of the affixes are productive. L2 learners of Chinese can acquire words with affixes easily and effectively by learning their rules. Even though some of the works mentioned in Section 5.1.2 discuss the meanings and syntactic functions of Chinese affixes, none of them analyzes them either clearly or completely. Following is a description of the common affixes in Chinese words, and it provides a general view and the rules for Chinese learners.

(1) Prefix

There are several prefixes in Chinese: 阿 *a*, 老 *lao*, 第 *di* 'rank-', 其 *qi* 'its-, that-', 以 *yi* 'from-', 当 *dang* 'just at-', that are always attached to a noun; and 可 *ke* 'able-', 不 *bu* 'no, not, un-', that are attached to verbs and adjectives.

阿 *a* is always attached to forms of address of family members or someone's name (last or first name) to form disyllabic intimate terms. It is mostly used in colloquial Chinese and some Chinese dialects. For example: 阿姐 *a-jie* [prefix-elder-sister] 'elder sister', 阿王 *a-wang* [prefix-Wang (surname)] 'Wang', 阿山 *a-shan* [prefix-Shan (name)] 'Shan'.

老 *lao* means 'old' when it is used freely. As a prefix, it mainly adds a syllable to a word and loses the semantic meaning. It appears in several situations.

1. To attach to a few bound monosyllabic-morphemes to form disyllabic words. This is the phonological function of 老 *lao*, and it is not unproductive. For instance: 老师 *lao-shi* [prefix-teacher] 'teacher', 老虎 *lao-hu* [prefix-tiger] 'tiger', 老鼠 *lao-shu* [prefix-mouse] 'mouse'.
2. To attach to a monosyllabic number (from two to ten) or 大 *da* 'big, large' and 小 *xiao* 'small' to denote seniority among siblings or the order of some ranks. E.g. 老大 *lao-da* [prefix-big] 'the eldest one, the number one', 老小 *lao-xiao* [prefix-small] 'the youngest one, the last one', 老二 *lao-er* [prefix-two] 'the second one'.
3. To attach to the monosyllabic surname of someone---who is above middle age and is a male---to form an intimate form of address. For instance, 老王 *lao-wang* 'Wang', 老李 *lao-li* 'Li'.
4. To form new colloquial words which refer to some class of people. For example, 老乡 *lao-xiang* [prefix-town] 'fellow-townsman', 老外 *lao-wai* [prefix-outside] 'foreigner', 老总 *lao-zong* [prefix-general (manager)] 'general manager; president', 老广 *lao-guang* [prefix-Canton] 'Cantonese'. This usage of 老 *lao* has two functions: 1) to contribute a semantic meaning---'a kind of people'---to the new word, and 2) to mark a casual style. It is a semi-productive prefix, and there is not a straightforward rule to tell which morpheme it can or cannot be attached to.

第 *di* is always attached to numbers to form ordinals. For instance, 第一 *di-yi* [rank-one] 'the first', 第十五 *di-shi-wu* [rank-ten-five] 'the fifteenth'.

其 *qi* is a third-person pronoun in both nominative and possessive cases in classical Chinese with the meaning of 'he, she, it, they, them; his, her, its, their'. As a prefix in modern Chinese, it usually means 'its-, that-'. E.g.: 其中 *qi-zhong* [its-middle] 'among (them)', 其实 *qi-shi* [its-fact] 'in fact', 其次 *qi-ci* [that-second] 'the second'. It carries some classical flavor.

Prefix 以 *yi* is attached to words of locations or directions to refer to a boundary. For example: 以前 *yi-qian* [at-front/before] 'before, ago', 以外 *yi-wai* [at-outside] 'the outside of', 以东 *yi-dong* [from-east] 'the east of', 以来 *yi-lai* [from-coming] 'since'.

当 *dang* as a prefix is usually attached to a noun to mean 'just at (a time or a place)'. E.g.: 当时 *dang-shi* [at-time] 'at that time', 当地 *dang-di* [at-place] 'local, in the locality', 当年 *dang-nian* [at-year] 'in those years, in those days (in the past)', 当面 *dang-mian* [at-face] 'in somebody's presence, to someone's face'.

可 *ke* means 'able, can' when it is used as a root in a compound. As a prefix, it is usually attached to a verb (state verb or action verb) to mean 'able to be V'. This function is productive. Examples are: 可吃 *ke-chi* [able-eat] 'edible', 可笑 *ke-xiao* [able-laugh] 'laughable, funny'. 可 *ke* can also be attached to a noun to mean 'fit N', but it is not very productive: 可人 *ke-ren* [fit-person] 'personable, lovely', 可口 *ke-kou* [fit-mouth] 'tasty, delicious', 可心 *ke-xin* [fit-heart] 'satisfying'.

不 *bu* 'not' is a negative word in Chinese, but it cannot be used alone. It may also be used as a productive prefix to attach to a verb, adjective or a noun to form a new word with a negative meaning. For instance: 不必 *bu-bi* [not-need] 'need not, do not have to', 不幸 *bu-xing* [not-fortunate] 'unfortunately', 不然 *bu-ran* [not-so] 'otherwise', 不满 *bu-man* [not-satisfy] 'dissatisfied'.

(2) Suffix

There are relatively more suffixes in modern Chinese. Most of them are nominal suffixes, such as -子 *-zi*, -儿 *-er/-r*, -头 *-tou*, -生 *-sheng*, -士 *-shi*, -员 *-yuan*, -者 *-zhe*, -家 *-jia* , -们 *-men*, -性 *-xing*, －的 *-de*. A few of them, like -化 *-hua*, -了 *-le*, -着 *-zhe*, -过 *-guo*, -得 *-de*, -地 *-de*, -起来 *-qilai* are verbal suffixes.

Suffix 子 *zi* has three functions: 1) To add a syllable to certain monosyllabic nominal morphemes to form a disyllabic word. For example, 桌子 *zhuo-zi* [table-suffix] 'table', 窗子 *chuang-zi* [window-suffix] 'window', 鞋子 *xie-zi* [shoe-suffix] 'shoe(s)'. 2) After a state verb (adjective) to form a noun with the meaning of 'a person who is A'. For instance, 胖子 *pang-zi* [fat-suffix] 'fat person, fatty', 聋子 *long-zi* [deaf-suffix] 'deaf-mute', 瞎子 *xia-zi* [blind-suffix] 'blind person'. Such words are informal expressions and sometimes have the tones of despite. 3) To attach to an action verb to form a noun with the meaning of 'the instrument used to V' or 'the person who Vs'. E.g., 剪子 *jian-zi* [cut-suffix] 'scissors', 梳子 *shu*-zi [comb-suffix] 'comb', 骗子 *pian-zi* [cheat-suffix] 'swindle'. All the words with a suffix 子 *zi* are nouns. In this case, 子 *zi* can be regarded as a marker for noun.

儿 *-er/-r* is also a nominal suffix with a function similar to 子 *-zi*: to add a phonological ending to some nouns. E.g. 花儿 *huar* [flower-suffix] 'flower', 窗儿 *chuangr* [window-suffix] 'window', 鞋儿 *xier* [shoe-suffix] 'shoe(s)', 画儿 *huar* [picture-suffix] 'picture, painting'. Mostly, its use is optional. In northern China, like in Beijing, people add 儿 *-r* to many monosyllabic and disyllabic nouns; but in southern China, people seldom use it.

头 *tou* means 'head'[2]. When it is used as a suffix, it occurs in five situations:

1. To attach to some nominal morphemes to form disyllabic nouns. The noun usually refers to something which is a lump or chunk. For example, 石头 *shi-tou* [stone-suffix] 'stone', 木头 *mu-tou* [wood-suffix] 'wood', 馒头 *man-tou* [steamed bun-suffix] 'steamed bun', 山头 *shan-tou* [hill-suffix] 'hill'.
2. To attach to a few action verbs to form the nouns with the meaning of 'the instrument used to V': 锄头 *chu-tou* [to hoe-suffix] 'hoe', 指头 *zhi-tou* [to point-suffix] 'finger'
3. After localizers and certain nouns to form locations. E.g. 前头 *qian-tou* [front-suffix] 'front', 上头 *shang-tou* [above-suffix] 'above', 地头 *di-tou* [field-suffix] '(on) field', 手头 shou-tou [hand-suffix] '(on) hand', 口头 kou-tou [mouth-suffix] '(by) mouth'.
4. To attach to certain state verbs to form nouns. E.g.: 甜头 *tian-tou* [sweet-suffix] 'sweetness, advantage, profit', 想头 *xiang-tou* [think-suffix] 'idea; hope', 苦 头 *ku-tou* [bitter-suffix] 'suffering, hardship', 开 头 kai-tou [begin-suffix] 'beginning'.
5. After an action verb to form a noun with the meaning of 'worth of V-ing'. E.g. 吃头 *chi-tou* [eat-suffix] 'the worth of eating', 说头 *shuo-tou* [speak-

Note: 2. Dai (1992, Chapter 5) argues that 头 *-tou* is an inflectional suffix because it does not change the category of the word it is attached to. However, the examples here show that it is a derivative suffix. First, it may change the category of the word it is attached to, as in the fourth function listed. Second, it may give a new semantic meaning to a word or morpheme. Even when it just adds a syllable to form a disyllabic noun, it still contributes a semantic meaning to the word: what the word refers to is something with the shape of a lump or chunk. This meaning is derived from its original meaning 'head'. None of its functions is totally syntactic. Thus, it should be treated as a derivative suffix.

suffix] 'the worth of saying'. This function is very productive.

Suffixes 生 *sheng*, 士 *shi*, 员 *yuan*, 者 *zhe* all mean 'person' and are similar to the English suffixes '-er' and '-or'. 生 *sheng*, 士 *shi* and 员 *yuan* are all attached to a monosyllabic word referring to some professional persons. 生 *-sheng* and 士 *-shi* are not productive, but -员 *-yuan* is more productive. E.g. 学生 *xue-sheng* [study-er] 'student', 医生 *yi-sheng* [medical-er] 'doctor'; 护士 *hu-shi* [caretake-er] 'nurse', 战士 *zhan-shi* [fight-er] 'warrior'; 教员 *jiao-yuan* [teach-er] 'teacher, faculty', 雇员 *gu-yuan* [hire-er] 'employee', 飞行员 *fei-xing-yuan* [fly-er] 'pilot', 官员 *guan-yuan* [official-er] 'officer (of government)', 驾驶员 *jia-shi-yuan* [drive-run-er] 'driver'. The suffix 者 *-zhe* is the most productive one among these suffixes. It not only refers to professionals, but it may also refer to a person who just does an action or who is in a kind of state. For example, 作者 *zuo-zhe* [write-er] 'writer, author', 读者 *du-zhe* [read-er] 'reader', 前者 *qian-zhe* [front-er] 'the former', 长者 *zhang-zhe* [eld-er] 'elder, senior person'. Moreover, it can also be attached to polysyllabic words to carry a classical flavor: 说话者 *shuo-hua-zhe* [speak-speech-er] 'the person(s) who (is/are) speak(ing), speaker'.

Suffix 家 *-jia* means '-ist' and always refers to professional experts. Such as 科学家 *ke-xue-jia* [science-ist] 'scientist', 教育家 *jiao-yu-jia* [educate-ist] 'educator', 政治家 *zheng-zhi-jia* [politics-ist] 'statesman, politician', 专家 *zhuan-jia* [special-ist] 'expert, specialist'. This suffix is very productive and can create new words.

性 *-xing* '-ity, -ness' may attach to nouns, verbs and adjectives (state verbs) to refer to a property or a feature. E.g., 共性 *gong-xing* [common/general-ity] 'commonality', 可能性 *ke-neng-xing* [possible-ity] 'possibility', 人性 *ren-xing* [human-

ity] 'humanity, human nature', 酸性 *suan-xing* [acid-ity] 'acidity'. This is also a productive suffix and can derive new words.

们 *-men* is a plural suffix for human beings. Such as 学生们 *xue-sheng-men* [student-s] 'students', 老师们 *lao-shi-men* [teacher-s] 'teachers', 人们 *ren-men* [person-s] 'people'. Such words usually refer to people in general and cannot be modified by specific words, numbers and quantities.

As a suffix, 的 *-de* has two functions in modern Chinese:

1. After nouns and pronouns to be a possessive marker. For example, 我的 *wo-de* [I-suffix] 'my, mine', 他们的 *ta-men-de* [he-plural-suffix] 'their, theirs', 学生的 *xue-sheng-de* [student-suffix] 'student's'.
2. After verbs (state verbs and action verbs) or verbal phrases to derive the meaning of 'the thing(s) to be V' or 'the person who does V'. E.g. 红的 *hong-de*, [red-suffix] 'the red one', 小的 *xiao-de* [small-suffix] 'the small one'; 吃的 *chi-de* [eat-suffix] 'the things for eating, food', 看的 *kan-de* [look/watch/read-suffix] 'the things for watching/reading', 卖东西的 *mai-dong-xi-de* [(sell-things)-de] 'the person who sells, seller'.

As a sentence particle, 的 *de* has more functions: a) as a nominal particle in noun phrases to mark the modification of a head noun, and b) to be combined with 是 *shi* 'be' to form a nominalized phrase. E.g. 我写 的 书 *wo xie de shu* [I write DE book] 'the book that I wrote'; 我是昨天来的 *Wo shi zuo-tian lai de* [I be yesterday come DE] 'it was yesterday that I came.' These functions are usually discussed in Chinese syntax. All the functions of 的 *de* can be generalized as nominalization.

化 *-hua* is a verbal suffix with the meaning of '-ize'. It can attach to nouns, adjectives (state verbs) and certain adverbs to derive new verbs. This is a very productive suffix. E.g.: 美国化 *mei-guo-hua* [America-suffix] 'to Americanize', 动词化 *dong-ci-hua* [verb-word-suffix] 'to verbalize', 老化 *lao-hua* [old-suffix] 'to age', 绿化 *lǜ-hua* [green-suffix] 'to greenize (by planting trees)', 正常化 *zhengchang-hua* [often/normal-suffix] 'to normalize'.

All the other verbal suffixes 了 *-le*, 着 *-zhe*, 过 *-guo*, 得 *-de*, 地 *-de*, 起来 *-qilai* are inflectional ones which are attached to verbs (state or action) or verbal phrases to mark tenses or aspects of actions and events. Many works about Chinese grammar have discussed these suffixes/particles (e.g. Chao 1968; Li and Thopson 1989; Chu 1983, 1996), and thus, their meanings and functions are not discussed here. However, there is a rule of their usages that L2 learners should know: none of these inflectional suffixes can be located after an intransitive verb-object compound. If the word that these suffixes attach to is a verb-object compound, the suffixes have to be put after the verbal morpheme, except for a few transitive verb-object compounds like 注意 *zhu-yi* [fill-attention] 'to pay attention to'. For instance:

> 说话 *shuo-hua* [speak-speech] 'to speak' → 说了话 *shuo-le-hua* 'have spoken'
>
> 念书 *nian-shu* [read-book] 'to study' → 念着书 *nian-zhe-shu* 'be studying'
>
> → 念 书 念 得 好 *nian-shu nian-de hao* [read-book read-DE good] 'to study well'

For 起来 *-qilai*, it must be inserted into the compound in the pattern verb-*qi*-object-*lai*. E.g. 说 起 话 来 *shuo-qi-hua-lai* [speak-QI-speech-LAI] 'to start to speak'.

(3) Infix

In modern Chinese, genuine infixes are very few, and almost none of them have any tangible meaning. A common one is 哩 *-li*. As Chao (1968, p. 257) points out, it is usually inserted into a disyllabic derogatory term to form a vivid partial reduplication. E.g.: 罗嗦 *luosuo* 'long-winded, wordy' → 罗哩罗嗦 *luo-li-luosuo* 'wordy'; 老气 *lao-qi* [old-air] 'old-fashioned; old-mannish' → 老哩老气 *lao-li-lao-qi* 'old-fashioned; old-mannish'.

Particle 得 *de* and negative word 不 *bu* can also be inserted into verb-complement compounds as infixes to form potential expressions. E.g.: 吃完 *chi-wan* [eat-finish] 'to finish eating' → 吃得/不完 *chi-de/bu-wan* [eat-able/not-finish] 'be-able/unable to finish eating'.

Since most of the affixes in Chinese are derivational and can produce new words, it will be important to teach L2 learners the common affixes discussed above. The knowledge of Chinese affixes may help L2 learners memorize words effectively and may also lead them to infer the meanings of many new words they come across on their own.

5.2.4 Abbreviations

Usually, a word in modern Chinese has no more than three syllables. Thus, proper nouns and many phrases which are more than three syllables are usually shortened by abbreviation. Abbreviation is a special pattern of words which serves as a meaningful unit and cannot be decomposed in sentences. With the fast development of society, economy and science, abbreviations in modern Chinese are used more and more frequently. To L2 learners, it is usually difficult to understand the meanings of Chinese abbreviations by themselves. Thus, formal instruction must include the teaching of common abbreviations

and their rules. Unfortunately, Chinese abbreviations have not caught much attention in Chinese linguistic study. Except for the work of Dou (1983), which mentions some rules for abbreviation (p.16 and p.125), no other books of Chinese grammar have discussed them. Sproat and Shih (1996) claim that Chinese abbreviations are lexically determined because there are a variety of ways to form an abbreviation (p.65). In fact, however, rules can be formulated despite Sproat and Shih's claim. Here are the general rules for typical Chinese abbreviations.

(1) Syntactic Categories

In Chinese, only polysyllabic (more than three syllables) proper nouns, nominal phrases and some verbal phrases can be abbreviated. However, fixed expressions like idioms, set phrases, etc. usually cannot be abbreviated. For example:

司机 与 售票员 *si-ji yu shou-piao-yuan* → 司售 *si-shou*
driver and sell-ticket-er 'driver (and) ticket seller (on a bus)'

中 国 语 言 文 学 系 *zhong-guo yu-yan wen-xue xi* → 中文系 *zhong-wen xi*
Chinese language literature department 'the department of Chinese language and literature'

扩充 容量 *kuo-chong rong-liang* → 扩容 *kuo-rong*
expand-fill contain-capacity 'to add capacity of contain'

研究与讨论 *yan-jiu yu tao-lun* → 研讨 *yan-tao*
study and discuss 'to study and discuss'

劳动改造 *lao-dong gai-zhao,* → 劳改 *lao-gai*
labor reform 'reform through labor'

(2) Syllables and Tones

Chinese abbreviations generally have no more than three syllables, and they also follow the rule of Chinese tone sandhi. The characters in each abbreviation usually keep their own tones. However, if the condition of tone sandhi is satisfied, some tones will be

changed. For example, a main tone sandhi rule in Mandarin is that a third tone pattern (214) changes to be a second tone pattern (35) when it is followed by another third tone: 214 + 214 → 35 + 214. If two syllables (characters) in an abbreviation both happen to be the third tone and linked together, the first one will change to a second tone pattern.

E.g.		Tone pattern		Tone sandhi
Full expression:	企业 管理 *qi-ye guan-li* 'business management'	214-51 214-214	→	214-51 35-214
Abbreviation:	企管 *qi-guan*	214-214	→	35-214

(3) Syllable-Selection

A. In modern Chinese, to abbreviate a phrase is to omit some syllables. Typically, the first syllable (character) of each word in a full expression is selected to compose an abbreviation. For instance:

Full expression		Abbreviation
超级 市场 *chao-ji shi-chang* super-degree market-square	→	超市 *chao-shi* 'supermarket'
环境 保护 *huan-jing bao-hu* around-environment protect-protect	→	环保 *huan-bao* 'environmental protect/protection'
奥林 匹克 运动会 *Aolinpike yun-dong hui* Olympic sport meeting	→	奥运会 *Ao-yun-hui* 'the Olympic Games'
社会 科学院 *she-hui ke-xue yuan* social science institute	→	社 科 院 *she-ke-yuan* 'the Institute of Social Science'

B. If a full expression contains more than three words, to satisfy the syllable rule of abbreviation, the selection will be: the first syllable of the first word + the first syllable of the second word or of the penultimate one + the first syllable of the last word.

中国语言文学系 *zhong-guo yu-yan wen-xue xi* → 中文系 zhong-wen xi
Chinese language literature department 'the department of Chinese language and literature'

西方语言文学系 *xi-fang yu-yan wen-xue xi* → 西语系 *xi-yu xi*
western language literature department 'the department of Western languages and literature'

世界妇女代表大会 *shi-jie fu-nu dai-biao da hui* → 世妇会 *shi-fu-hui*
world women representative large meeting 'the Conference of International Women'

C. In order to avoid misunderstanding or ambiguity, neither prefixes nor conjunctions are selected to compose an abbreviation. If the last word of a full expression is a disyllabic one, the monosyllabic adjective before it will not be selected. The modifier V or A of a nominal V-N or A-N compound may not be selected, either, to avoid ambiguity. Moreover, if the first syllables of two words in a phrase happen to be the same, they will not be used. For example:

第一中学 *di-yi zhong-xue* → 一中 *yi-zhong*
rank-one middle-school 'The First Middle School'

研究与讨论 *yan-jiu yu tao-lun,* → 研讨 *yan-tao*;
study and discuss 'to study and discuss'

文化大革命 *wen-hua da ge-ming* → 文革 *wen-ge*
culture big revolution 'the Cultural Revolution'

结婚用品 *jie-hun yong-pin* → 婚品 *hun-pin*
make-marriage use-article 'articles for marrying'

电影与电视 *dian-ying yu dian-shi* → 影视 *ying-shi*
electricity-reflection and electricity-vision 'movies and TV (programs)'

D. A few abbreviations are used in a habitual way. If the last word of a full expression is 公司 *gong-si* [public-department] 'company' or 学院 *xue-yuan* [study-

yard/place] 'college', it will either be dropped or kept as a full form. This is because choosing either syllable of such a word may cause ambiguity.

中国航空公司 *zhong-guo hang-kong gong-si* → 中航 *zhong-hang*
China air-line company 'the Chinese Air Company'

中国建筑公司 *zhong-guo jian-zhu gong-si* → 中建公司 *zhong-jian -gong-si*
China build company 'The Chinese Architectural Company'

南京医药学院 *nan-jing yi-yao xue-yuan* → 南医 *nan-yi*
Nanjing medical college 'Nanjing Medical College'

工程学院 *gong-cheng xue-yuan* → 工学院 *gong-xue-yuan*
engineering college 'the College of Engineering'

If the last word is 银行 *yin-hang* [silver-trade] 'bank', the second syllable is chosen traditionally:

人民银行 *ren-min yin-hang* → 人行 *ren-hang*
people bank 'The People's Bank'

农业银行 *nong-ye yin-hang* → 农行 *nong-hang*
agriculture bank 'Bank of Agriculture'

However, recently, the first syllable is selected to follow the prototypical rule:

中国银行 *zhong-guo yin-hang* → 中银 *zhong-yin* or 中行 *zhong-hang*
China bank 'Bank of China'

世界银行 *shi-jie yin-hang* → 世银 *shi-yin*
world bank 'The International Bank'

(4) Shortened Form of Places

When a term refers to an area covering more than one city or province, monosyllabic historical names of different places are used to compose a special kind of shortened term without dropping some syllables of the original expression. A lot of names of cities and provinces in China share the first character, such as 山东 *Shandong,* 山西

Shanxi; 湖南 *Hunan*, 湖北 *Hubei*, etc. If a phrase referring to two or more places is abbreviated as the composition of their first-syllables, it would cause misunderstanding. Fortunately, all the provinces and some big cities have their own monosyllabic historical names which are used as their code names today. For instance, 沪 *Hu* is 上海 Shanghai, 京 *Jing* is 北京 Beijing, 台 *Tai* is 台湾 Taiwan. These short names are used in a new term to denote more than one place.

E.g. 台湾 Taiwan and 福建 Fujian → 台闽 *Tai-Min*

山西 Shanxi and 山东 Shandong → 晋 鲁 *Jin-Lu*

上海 Shanghai and 南京 Nanjing → 沪宁 *Hu-Ning*

If a place does not have a special short term, the first character of its modern name will be used: 香港 *Xianggang* and 澳门 *Aomen* → 港澳 *Gang-Ao* 'Hong Kong and Macao' (港 *gang* is the traditional term for Hong Kong, but there is no traditional name for Macao).

The general rules listed above can help L2 learners get to know how Chinese abbreviations are formed and thus, permit them to figure out the original forms by themselves. In Chinese language courses, both common abbreviations and their original forms should be introduced at the same time in order to let students understand the meanings and formulations easily.

In this chapter, the general rules of four word types, i.e. mono-morphemic words, reduplications, Root-Affix words and Abbreviations, have been discussed. In the following chapter, the analysis of compounds, which is the main word type of Modern Chinese, will be presented in order to provide all the general rules of Chinese word structure for L2 learners.

CHAPTER 6
CHINESE WORD STRUCTURE (II) --- COMPOUNDS

Chapter Five has discussed previous studies of Chinese words and general rules governing four types of Chinese words: mono-morphemic words, reduplications, affixes and a special type—abbreviations. This chapter will discuss another type of Chinese word—compounds, which are much larger in number and higher in frequency of use than the other types.

6.1 Compounds in Modern Chinese

In morphology, a compound is "the concatenation of words to form other words" (Spencer 1991, p. 309). In modern Chinese, the concept of a compound is much more complex. The components of a Chinese compound are generally words of classical Chinese, but they are not necessarily words (free morphemes) of modern Chinese. According to the statistics of Yuan and Huang (1998), about 31% of modern Chinese morphemes are free morphemes, and the rest are bound morphemes, which have to be combined with other morphemes to form words. Thus, a compound in modern Chinese is actually a combination of two or more morphemes (either free or bound morphemes), which may often be classical Chinese words. In this sense, reduplications and words with affixes may also be regarded as compounds. This study, however, excludes these two types of words from compounds because that compounds are measured by the following

three criteria: 1) a compound must consist of two or more different morphemes, 2) each morpheme must have a semantically definable meaning, and 3) none of the morphemes should be in a fixed position when combined with other morphemes. These criteria are extended from the general definition of compound in morphology.

A compound is a word. Thus, it is a lexical item and is different from a phrase. A typical compound has these features: 1) it is a basic semantic expression, and its meaning may not be the simple composition of its components, 2) intra-word phonological rules, such as neutral tones and stress, may apply to the compound, 3) it is the smallest syntactic unit in sentences and cannot be split up by parentheticals (i.e. other words or phrases). Nevertheless, there is not a clear-cut division between compounds and phrases. Some compounds are more like words, but some are more like phrases. For example, compounds 吃饭 *chi-fan* (eat-food, 'to eat') and 说话 *shuo-hua* (speak-speech, 'to speak') are between words and phrases. Their meanings are lexicalized and must be learned as a unit, but they can be split up by syntactic particles or other words as 吃了饭 *chi-le-fan* (eat-LE-food, 'have eaten'), 说着话 *shuo-zhe-hua* (speak-ZHE-speech, 'be speaking'). These marginal compounds will be discussed in detail when related questions are presented in this chapter.

In modern Chinese, most of the words are compounds. Table 6.1 shows the numbers of compounds in the vocabulary lists of *Han-yu Shui-Ping Ci-hui yu Han-zi Deng-ji Da-gang* 汉语水平词汇与汉字等级大纲 (Criteria for Chinese Vocabulary and Characters at Different Proficiency Levels) (1992).

Table 6.1 Compounds in *Han-yu Shui-Ping Ci-hui yu Han-zi Deng-ji Da-gang* (Criteria for Chinese Vocabulary and Characters at Different Proficiency Levels)

	1st Level	2nd Level	3rd Level	4th level	Total
Words	1033	2018	2202	3569	8822
Compounds	520 (50.3%)	1342 (66.5%)	1668 (75.8%)	3019 (84.6%)	6549 (74.2%)

The first level is the beginning level, the second and third levels are the intermediate, and the fourth level is the advanced. Clearly, the higher the level is, the larger the number of compound words used. It is even more impressive when the coverage of the words for all four levels is considered. According to the statistics presented in the preface of the Criteria (p. 12), the nearly 9,000 lexical items cover 95% of the vocabulary in general reading materials. In other words, about 70% of the general-reading vocabulary are compound words. Nothing speaks louder than this fact does for the importance of studying compounds in Chinese vocabulary acquisition and teaching. It is especially important for L2 learners of Chinese to know the general rules and patterns of Chinese compounds in order to more effectively acquire the large number of compounds.

6.2 Patterns of Chinese Compounds

Traditionally, Chinese compounds are said to be formed in five patterns: modifier-head, subject-predicate, verb-object, verb-complement and parallel (coordinate) compounds. All of them are named by the internal syntactic structure. This classification, however, has some practical problems. Semantic relationships of the components are more tangible to L2 learners of Chinese than syntactic relationships and can help them

understand the meanings of compounds. Moreover, the syntactic structures of some Chinese compounds can be ambiguous. For example, 烤鸭 *kao-ya* [roast-duck] 'roast duck' and 存款 *cun-kuan* [store-money] 'deposit' can be either verb-object or modifier-head. To avoid this ambiguity, morphological patterns are used in this study. Chinese compounds are grouped into three major patterns: 1) endocentric compounds, in which one component functions as the head and the other as a modifier; 2) exocentric compounds, in which no elements can be regarded as a head; and 3) parallel (or dvandva) compounds, in which the components form a conjunction (see Spencer 1991, Chapter 8). These three types are the basic ones. Some Chinese compounds may be more complex and can be regarded as 4) complex compounds, which consist of two or more of the basic patterns or one basic pattern with an affix. In this section, both syntactic structures and the types of semantic combinations in each basic pattern will be listed and discussed. Moreover, since 95% of compounds in modern Chinese are nouns, verbs and adjectives [1] (Yuan and Huang 1998), these three categories will be the focus of this study.

6.2.1 Endocentric Compounds

An endocentric compound can be a noun, a verb, an adjective or an adverb. The first three categories will be the main emphasis in our discussion.

The syntactic structure of these compounds is Modifier-Head. If N, V, and A refer to noun, verb, and adjective, in a nominal compound, the syntactic categories of its roots can be N(N, A), A(N, V) or VN. In a verbal one, the combination can be (V, N, A)V. In

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Note: 1. Adjectives are more often termed as "state verbs" in Chinese syntax, since they share functions with verbs. But to L2 learners, the term "adjective" is more familiar and easier to understand, thus we adopt the traditional name to refer to the Chinese "state verb".

an adjective compound, the roots can be A(A, V, N), V(N, A), or NA. The semantic patterns of the roots in these compounds are complex, and they are discussed in the following.

(1) N1-N2 → N

If a Chinese compound contains two nominal components, the compound is always a noun. The semantic relations of the two components can be generalized as Specific-Object/Concept, in which the second component refers to an object or concept and the first one specifies the object/concept by referring to a material, a source, a time, a location, an aim, a method, or a sample, etc. For example:

Material-Object ('N2 is made of or contains N1'): 木箱 *mu-xiang* [wood-box/chest] 'wooden chest', 草地 *cao-di* [grass-land] 'lawn, grassland'.

Sample-Object ('N1 is a category of N2'): 松树 *song-shu* [pine-tree] 'pine-tree', 茉莉花 *moli-hua* [jasmine-flower] 'jasmine'.

Source-Object ('N2 is from N1'): 牛肉 *niu-rou* [cattle-meat] 'beef', 鸡蛋 *ji-dan* [chicken-egg] 'chicken egg', 石油 *shi-you* [stone-oil] 'petroleum'.

Specific-Concept ('N2 is of N1'): 金属 *jin-shu* [metal-belonging] 'metal', 周末 *zhou-mo* [week-end] 'weekend', 农村 *nong-cun* [peasant-village] 'village (of peasants), rural area, countryside', 数学 *shu-xue* [number-study] 'mathematics', 医学 *yi-xue* [medicine-study] 'medical science'.

Time-Object/Action/Concept ('N2 is at the time of N1'): 早饭 *zao-fan* [morning-meal] 'breakfast', 暑假 shu-jia [summer-vacation] 'summer vacation/break (of school)', 早操 *zao-cao* [morning-exercise] 'morning exercise'.

Location-Object/Concept ('N2 is located at N1'): 手表 *shou-biao* [hand-watch] 'watch', 京剧 *jing-ju* [Beijing-opera] 'Beijing Opera', 内部 *nei-bu* [inside-part] 'inside'.

Aim-Place ('N2 is the place for N1'): 图书馆 *tu-shu-guan* [picture-book-hall] 'library', 饭店 *fan-dian* [meal/food-store] 'restaurant', 车站 *che-zhan* [vehicle-station] 'bus station', 幼儿园 *you-er-yuan* [young-child-yard] 'nursery school, kindergarten'.

Method-Object ('N2 is operated by/with N1'): 篮球 *lan-qiu* [basket-ball] 'basketball', 足球 *zu-qiu* [foot-ball] 'soccer', 汽车 *qi-che* [gas-vehicle] 'car'.

Transliteration-Description (N1 is a transliteration, N2 is the Chinese category): 啤酒 *pi-jiu* [beer-liquor] 'beer', 吉普车 *jipu-che* [jeep-vehicle] 'jeep', 费城 *fei-cheng* [Phi(ladelphia)-city] 'Philadelphia', 佛州 *fo-zhou* [Flo(rida)-state] 'Florida', 澳洲 *ao-zhou* [Au(stralia)-continent] 'Australia'.

(2) V1-N2 → N

An endocentric V-N compound is also a noun. The semantic structures contain the following types:

Action-Location ('N2 is the place for doing V1'): 学校 *xue-xiao* [study-(comparative field)] 'school', 教室 *jiao-shi* [teaching-room] 'classroom' 医院 *yi-yuan* [(medical treat)-yard] 'hospital', 到处 *dao-chu* [reach/arrive-place] 'everywhere'.

Action-Actor ('N2 is the person or object doing V1'): 护士 *hu-shi* [(take care)-person] 'nurse', 介绍人 *(jie-shao)-ren* [introduce-person] 'introducer', 动物 *dong-wu* [move-object] 'animal', 飞机 *fei-ji* [fly-machine] 'airplane'.

Action-Receiver ('N2 is manipulated by action V1'): 烤鸭 *kao-ya* [roast-duck] 'roast duck', 泡菜 *pao-cai* [soak-vegetable] 'pickled vegetable, pickles', 炒面 *chao-mian* [fry-noodle] 'fried noodles', 产品 *chan-pin* [produce-thing] 'product'.

(3) N1-N2→ N or **V1-N2→ N**

Some semantic types of nominal endocentric compounds can be either N-N or V-N structure. They are listed as follows:

Goal-Instrument ('N2 is an instrument for N1 or for doing V1'): 茶杯 *cha-bei* [tea-cup] 'tea cup', 花瓶 *hua-ping* [flower-bottle] 'vase'; 邮票 *you-piao* [post-ticket] 'postage stamp', 躺椅 *tang-yi* [lie-chair] 'reclining chair', 读物 *du-wu* [read-material] 'reading material'. In this semantic type, the second morpheme can also be a nominalized verb: 信封 *xin-feng* [letter-seal (sealer)] 'envelope', 球拍 *qiu-pai* [ball-pat (bat)] 'bat; racket', 手套 *shou-tao* [hand-cove (cover)] 'gloves; mittens', 书包 *shu-bao* [book-wrap (bag)] 'book bag'.

Result-Cause ('N2 is the object that causes N1 or does V1'): 病菌 *bing-jun* [disease-bacterium] 'germs', 笑话 *xiao-hua* [laugh-speech] 'joke', 笑气 *xiao*-qi [laugh-gas] 'laughing gas; nitrous oxide'. Compounds of this sort are few in number and they are not usually productive.

(4) N1-A→N

A few nominal compounds have an N-A structure, and their semantic type is always **Object-Feature** ('N1 has the feature of A'): 饼干 *bing-gan* [cake-dry] 'dry cake→ cookie', 蛋白 *dan-bai* [egg-white] 'egg white', 蛋黄 *dan-huang* [egg-yellow] 'yolk'.

(5) Varied Structure

In some semantic types like Method-Action, Comparant-Compared, and Feature-Described, the syntactic category of components varies. Each component can be a noun, a verb, an adjective or even an adverb. Mostly, the syntactic feature of such a compound

is the same as the second component, and its meaning can be derived by the components and structure; but sometimes, the compound is less typical and more lexicalized, and the syntactic category of the compound is different from the head-component. The meaning of a lexicalized compound may be more abstract and cannot be derived directly from its components. Thus, such a compound is better to be treated as a whole unit in word teaching and learning.

Method-Action (N1/V1/ADV1-V2→ V or N)

Mostly, such compounds are verbs with the meaning of 'action V2 is done by the way of X (N, V) or in some degree/state of X (Adv.)'. E.g.: 口试 *kou-shi* [mouth-test] 'oral test', 宴请 *yan-qing* [banquet-invite] 'to treat with banquet', 前进 *qian-jin* [front-march] 'to march forward', 相见 *xiang-jian* [mutual-see] 'to see/meet with each other', 再见 *zai-jian* [again-see] 'bye, see-you-again', 再婚 *zai-hun* [again-marry] 'remarry', 抛售 *pao-shou* [throw-sell] 'to sell in big quantities'. A few such compounds are nouns with a nominalized meaning: 邻居 *lin-ju* [near-live] 'neighbor', 总统 *zong-tong* [total-control] 'president (of a nation)', 会议 *hui-yi* [meet-talk] 'meeting, conference'.

Comparant-Compared (N1/V1-N2/V2/A2 → N/V/A)

Such compounds have the meaning of 'a state/object/action like X (N1or V1)'. For example: a) N1-N2 → N: 冰糖 *bing-tang* [ice-candy/sugar] 'crystal sugar; rock candy', 橄榄球 *ganlan-qiu* [olive-ball] 'American football'; b) N1-V2→ V: 林立 *lin-li* [woods-stand] 'stand in great numbers', 鸟瞰 *niao-kan* [bird-look] 'to get a bird's-eye view'; and c) V1/N2-A2→ A: 飞快 *fei-kuai* [fly-fast] 'as fast as flying, very fast', 金黄 *jin-huang* [gold-yellow] 'golden yellow', 雪白 *xue*-bai [snow-white] 'as-white-as-snow'.

Feature-Described (A1-N2/V2/A2 → N/V/A)

In this semantic type, the first root A1 is always an adjective which describes a feature, and the second one is an object/concept, an action or a state which is described/modified by A1. E.g.: a) A1-N2 → N or A: 大衣 *da-yi* [large-clothes] 'overcoat', 快车 *kuai-che* [fast-vehicle] 'express train/bus', 热心 *re-xing* [hot-heart] 'enthusiastic, warmhearted', 低级 *di-ji* [low-degree] 'elementary, vulgar, low'; b) A1-V2→ V, A or N: 暗示 *an-shi* [dark-show] 'hint', 深入 *shen-ru* [deep-enter] 'go deep into; penetrate into', 迟到 *chi-dao* [late-arrive] 'to arrive late', 难看 *nan-kan* [hard-look] 'ugly; shameful', 好吃 *hao-chi* [good-eat] 'delicious, tasty', 新闻 *xin-wen* [new-hear] 'news', 冷饮 *leng-ying* [cold-drink] 'cold drink/beverage', 软卧 *ruan-wo* [soft-lie] 'soft berth'; and c) A1-A2→ A: 鲜红 *xian-hong* [bright-red] 'bright-red', 深蓝 *shen-lan* [deep-blue] 'dark-blue', 淡黄 *dan-huang* [light-yellow] 'light-yellow'.

In modern Chinese, about 80.6% of the nominal compounds are endocentric (modifier-head) compounds (Yuan and Huang 1998). Mostly, the syntactic category of such a compound is the same as its head, which is the right-side component. Such general facts can be very useful for L2 learners to understand new words which are endocentric compounds. Moreover, nearly all of the semantic types listed above also appear in other languages like English. For example, wooden-table (Material-Object), Sunday-school (Time-Object), spoon-handle (Specific-Category), study-room (Action-Location), coast-road (Location-Object), bookstore (Aim-Place), pie-tin (Goal-Instrument), running-dog (Action-Actor), roast-duck (Action-Object), supermarket (Feature-Described), pan-fry (Method-Action), cherry-tomato (Comparant-Compared), football (Method-Object), egg-white (Object-Feature). Thus, L2 learners of Chinese do not have to memorize these

types one by one but just directly transfer their first language knowledge to help them infer the meanings of unfamiliar endocentric compounds. Only the compounds of the Feature-Described semantic type need more attention because the structure of such compounds are varied and the meanings may have been fossilized, i.e. they are very close to lexical items.

In an adverbial compound, the category of the morphemes can be adverb-verb as in 更加 *geng-jia* [more-add] 'even more', verb-noun as in 立刻 *li-ke* [stand-time] 'at once', adverb-adjective as in 不必 *bu-bi* [not-must/necessary] 'do not have to', and number-verb/adjective as in 一共 *yi-gong* [one-all] 'total, totally', 一起 *yi-qi* [one-up] 'together'. Adverbial compounds are few in number and are not productive. Their meanings are lexicalized and are not the sum of the meaning of their components. L2 learners must learn them in context and memorize them as undecomposable lexical items.

6.2.2 Exocentric Compounds

In an exocentric compound, none of the components can be a head. The meaning of the compound is a meaning composition of its components or is lexicalized. The resulting category of such compounds can be a noun, an action verb, an adjective or an adverb. The combination of the roots can be N(A, V), A(N, V), V(N, A), VV, or AA. The syntactic pattern of such a compound is Subject-Predicate, Predicate-Object, or Predicate-Complement. The semantic types are discussed in the following.

A. Subject-Predicate

(1) Subject-State (N1-A2→A)

The two components in such compounds are like subject and predicate, and the subject is a nominal root and the predicate is a state verb (an adjective). Mostly the compound is also a state verb (adjective), and the meaning may be the composition of the

two components or a metaphor. For example: 自大 *zi-da* [self-big] 'self-important, arrogant', 年轻 *nian-qing* [age-light] 'young', 眼红 *yan-hong* [eye-red] 'covet; be envious; be jealous', 头痛 *tou-tong* [head-pain] 'headache'.

(2) Actor-Action (N1-V2→ V, N or A)

This one is similar to the first pattern, but the predicate is an action verb. Most of such compounds are verbs which may also be used as nouns, a few of them are only used as adjectives. E.g.: 民主 *min-zhu* [people-direct] 'people-govern; democracy; democratic', 地震 *di-zhen* [earth-shake] 'earthquake', 自治 *zi-zhi* [self-govern] 'autonomy; autonomous', 神往 *shen-wang* [spirit-go] 'be charmed, be enchanted', 自动 *zi-dong* [self-move] 'automatic', 人造 *ren-zao* [man-make] 'man-made; artificial'.

B. Predicate-Object

(3) State-Object (A1-N2→ A)

Usually, such compounds are adjectives which can be used as predicates in sentences. For example, 细心 *xi-xin* [fine-heart] 'careful', 满意 *man-yi* [full/filled-feeling] 'satisfied', 准时 *zhun-shi* [accurate-time] 'punctual; on time', 空前 *kong-qian* [empty-front] 'unprecedented'. A few of such compounds are only used as action verbs, such as 干杯 *gan-bei* [dry-cup] 'to make the cup dry→ to drink a toast/bottom-up'.

(4) Action-Object (V1-N2→ V, N or A)

This pattern is also termed Verb-Object. Most of such compounds are verbs with the meaning of 'to do the action of V1-ing N2', but some are nouns or adjectives (state verbs). E.g.: 报名 *bao-ming* [report-name] 'to sign up', 读书 *du-shu* [read-book] 'to study', 办公 *ban-gong* [do-business] 'to work, to do official business', 谈话 *tan-hua* [talk-speech] 'to talk'; 管家 *guan-jia* [manage-home] 'to keep house; house-keeping; a

butler', 司机 *si-ji* [manage-machine] 'driver', 扶手 *fu-shou* [support-hand] 'handrail; armrest'; 听话 *ting-hua* [listen-to-words] 'be obedient; to listen to someone', 放心 *fang-xin* [put-down-heart] 'feel relieved; be at ease', 抱歉 *bao-qian* [carry-sorry] 'be sorry; feel apologetic; regret'.

(5) Action-Instrument (V1-N2 → V, 'to do V1 with N2'): 打针 *da-zhen* [hit-needle] 'to inject; to give an injection', 跳绳 *tiao-sheng* [jump-rope] 'rope skip; rope skipping', 开刀 *kai-dao* [open-knife] 'to perform or have an operation/surgery'.

(6) Action-Location (V1-N2→V, 'Action V1 is at/toward/from N2'): 滑冰 *hua-bing* [slide-ice] 'to skate; ice-skating', 住院 *zhu-yuan* [state-hospital] 'to be in hospital', 起床 *qi-chuang* [rise-bed] 'to get up from bed', 上学 *shang-xue* [up-school] 'go to school'.

A rule that L2 learners should know and must pay attention to: a verbal Predicate-Object (V/A-N) compound is usually an intransitive verb, and the two components can be separated by an aspectual particle, measure word or any other type of word/phrase. In a sentence, if there is another object, it has to be the object of a preposition and is located before the compound. For instance: 报了名 *bao-le ming* [report-LE name] 'have signed up', 睡了一大觉 *shui-le yi da jiao* [sleep-LE one big sleeping] 'to have a good sleep', 跟她结婚 *gen ta jie-hun* [with her tie-marriage] 'to marry her'. Since the components of such compounds can be separated in sentences, these compounds are also called "free-bound words (离合词 *li-he-ci*)". Semantically, they are words and are basic meaningful expressions; syntactically, they are more like phrases. Some such verbs which are not Predicate-Object compounds may also be treated as one by insertions between the components. For example, 幽默 *youmo* 'humorous, humor' → 幽他一默 *you ta yi mo*

[YOU him one MO] 'to make a fun of him'. Only a few Predicate-Object verbs like 注意 *zhu-yi* [fill-mind] 'to pay attention to', 放心 *fang-xin* [putdown-heart] 'to feel relieved', 担心 *dan-zin* [take-heart] 'to worry about', 关心 *guan-xin* [involve-heart] 'be concerned with', in which the second components are usually something about mind, can be used transitively to have an object directly after them in a sentence. For instance: 注意他 *zhu-yi ta* [fill-mind he] 'watch out on him'. However, even among these compounds, the two components are not always tightly bound. The degree of closeness between the V and N varies in different usages, and an insertion is also possible in some instances: 注点意 *zhu dian yi* [fill little mind] 'to pay a little attention', 放不下心 *fang bu xia xin* [put not down heart] 'cannot be relieved', 担不少心 *dan bu shao xin* [take not few heart] 'to worry about very much', 关一下心 *guan yi-xia xin* [involve one heart] 'be concerned with for a while'.

C. Verb-Complement

(7) Action/State-Result (A1/V1-A2/V2→ V)

Chinese simple verbs (action verbs and state verbs) usually are non-perfective aspect and only mean 'try to do V' or 'try to cause a state', and they do not tell about the result. Thus, another component is usually attached to a verb to tell about the result of the action. For example, 吃完 *chi-wan* [eat-finish] 'to finish eating', 看见 *kan-jian* [look-appear] 'to see', 构成 *gou-cheng* [construct-become] 'to form as', 改为 *gai-wei* [change-become] 'to change into'. The structure of such compounds may be the combination of V1-A2, A1-V2, V1-V2 or A1-A2. Thus, such compounds are also termed resultative V-V compounds, in which the two components are verbs (action or state verbs/adjectives). This pattern is quite unique in modern Chinese and is highly productive. As the

compounds of this pattern have special meanings and grammatical functions in sentences and they sometimes are ambiguous, many studies have discussed them. Most of the studies, however, were done in the framework of the Government-Binding theory, such as Li 1990, Gu 1992, and Zou 1994. They merely focus on the syntactic problems of such compounds and try to explain the sentences containing them by the Theta-role Theory and the Causative Theory. They all ignore the semantic features of different resultative compounds. Nor do they notice that the thematic and causative roles of the arguments in a sentence are always decided by the meaning of a resultative compound and its components in the sentence. As a result, despite their contribution to syntactic theory, they can hardly be applied in the vocabulary pedagogy of CFL/CSL. To be more practical, we have formulated the following rules (a)-(d) to help L2 learners interpret the meaning of a sentence containing an Action/State-Result compound.

a. When a **V1-A2 (Action-State)** compound is used in a sentence with subject X and object Y, the sentence meaning is: 'X do(es) action of V1-ing and causes Y to be in the state of A2'.

E.g. 李四染黑了头发 *Lisi ran-hei-le tou-fa.*
Lisi dye-black-ASP hair 'Lisi dyed his hair black.'

I.e. Lisi did the action of dying and his hair became black.

If A2 (the state verb) must apply to an animate argument but the object NP is inanimate, then the state of A2 will be interpreted as pertaining to the subject rather than to the object. As a result, the sentence is interpreted as 'X do(es) the action of V1-ing Y, and X get(s) to be in the state of A2'.

E.g. 张三吃饱了饭 *Zhangsan chi-bao-le fan.*
Zhangsan eat-full-ASP meal
'Zhangsan has eaten the meal and got to be full.'

I.e. Zhangsan did the action of eating a meal and he became full.

b. When an **A1-V2 (State-Action)** compound appears in a sentence with both subject X and object Y, the sentence is interpreted as 'X causes Y to be in the state of A1, and as a result Y do(es) the action of V2.'

E.g. 他气跑了顾客 *Ta qi-pao-le gu-ke.*
He upset-run-ASP customers 'He upset the customers and they left.'

I.e. he caused the customers to be upset and they left.

c. In a sentence with a **V1-V2 (Action-Action)** Compound, if the subject X is the agent of V1, the object Y is the patient of V1 and the agent of V2, then the sentence is interpreted as 'X do(es) the action of V1 and cause(s) Y to do the action of V2'.

E.g. 张三赶走了李四 *Zhangsan gan-zou-le Lisi.*
Zhangsan drive-go-ASP Lisi 'Zhangsan kicked Lisi out.'

I.e. Zhangsan did the action of "kick" and caused Lisi to do the action of going away.

d. When an **A1-A2 (State-State)** compound is used, the sentence means 'subject X cause(s) object Y to be in the state of A1, and as a result Y gets into the state of A2'.

E.g. 繁重的家务累病了母亲. *Fan-zhong de jia-wu lei-bing-le mu-qin.*
Heavy DE housework tire-sick-ASP mother
'The heavy housework made mother tired sick.'

I.e. the heavy housework caused "mother" to be tired, and as a result, she got sick.

The four rules above can be further generalized: 1) if V1 is an action verb, then the subject of the sentence is the agent of the action, and either the subject or the object of the sentence will be in the state of A2 (Rule a) or do the action V2 (Rule b); 2) if the first

component is an adjective (state verb), then the subject causes the object to be in the state of A1, and as a result, the object does the action of V2 (Rule c) or gets into the state of A2 (Rule d).

These rules should be very useful to L2 learners who have acquired a knowledge of participant roles: in a non-passive sentence, the subject is usually the doer of an action or the causer of a changed state, the object is the recipient of the action or is caused to be in a changed state. The same applies to a Chinese sentence with an Action/State-Result compound. What L2 learners should know additionally is whether the result (the second component A2 or V2) applies to the subject or to the object. A simple rule of thumb solves the problem quite easily: V2 always pertains to the object, but A2 may pertain to the subject when it is not compatible with the object. For example, in classroom instruction, a simple sentence with one verb can be provided first:

我气了他 *Wo qi-le ta.* [I angry-ASP he] 'I upset him.'

Students can understand this sentence without problems: the subject caused the object to be upset. Then a resultative component is added:

我气走了他 *Wo qi-zuo-le ta.* [I angry-go-ASP he]
'I made him angry and (as the result) he left.'

This time, L2 learners only need to pay attention to the added verb. It is an action verb, therefore, the result applies to the object: the object 他 *ta* 'he' did the action of 走 *zou* 'going'.

In all the exocentric compounds discussed above, Subject-State and State-Object compounds are usually adjectives (state verbs), Action-Object, Action-Location and Action/State-Result compounds are verbs (action verbs). Actor-Action compounds may

be adjectives or nouns, but most of them are verbs. Most exocentric compounds are at the border between morphology and syntax, that is: their internal structures are the same as those of corresponding phrases and are syntactically analyzable.

In modern Chinese, adverbs may also be exocentric compounds. The combination of the two components can be Action-Actor (N-V) (e.g. 眼看 *yan-kan* [eye-look] 'helplessly'), Action-Location (V-N) (e.g. 到底 *dao-di* [reach-bottom] 'after all'), and P(preposition)-V (e.g. 从来 *cong-lai* [from-come] 'always'). Since the number of such adverbs are few and the meanings of many adverbs are lexicalized, they are better treated as whole lexical items in CSL/CFL teaching and learning. Decomposing analysis is not very necessary.

6.2.3 Parallel Compounds

In parallel compounds, the two components are either synonyms or antonyms, and their syntactic relationship is coordination. Such compounds can be nouns, verbs, adjective, adverbs and prepositions. The combinations can be N1-N2, V1-V2, A1-A2, P (preposition)1-P2, and ADV(adverb)1-ADV2. If the two components are synonyms, the compound meaning usually equals the meaning of any one component, but sometimes the syntactic category is changed; if the components are antonyms or refer to different things, the compound meaning is usually the sum of the two components, but sometimes, it only has the meaning of one components or the syntactic category is changed.

(1) Compound Meaning = Root1 or Root2

a. N1-N2→ N: 海洋 *hai-yang* [sea-ocean] 'ocean', 城市 *cheng-shi* [city-city] 'city', 儿童 *er-tong* [child-kid] 'children, kids'.

b. V1-V2→V, or V & N: 帮助 *bang-zhu* [help-help] 'to help', 奔跑 *ben-pao* [run-run] 'to run'; 考试 *kao-shi* [exam-test] 'to have a test/exam; test, exam', 爱好 *ai-hao* [love-like] 'to like; hobby'.

c. V1-V2→ N: 教授 *jiao-shou* [teach-give] 'professor', 知识 *zhi-shi* [know-know] 'knowledge', 学问 *xue-wen* [learn-ask] 'learning, knowledge', 行为 *xing-wei* [act-do] 'action'.

d. V1-V2→ V or A: 踊跃 *yong-yue* [jump-jump] 'to leap; eagerly, enthusiastic', 保守 *bao-shou* [protect-guard] 'to keep; conservative', 开通 *kai-tong* [open-open] 'to open; open minded'.

e. A1-A2→ A, or A or N: 安静 *an-jing* [peace-quiet] 'quiet', 喜欢 *xi-huan* [happy-glad] 'like', 危险 *wei-xian* [dangerous-dangerous] 'dangerous; danger', 黑暗 *hei-an* [black-dark] 'dark; darkness'.

f. A1-A2→ V: 破坏 *po-huai* [broken-bad] 'to damage, to destroy, to break', 危害 *wei-hai* [dangerous-harm] 'to harm'.

g. P1-P2→ P: 自从 *zi-cong* [from-from] 'since (for "time")'.

h. ADV1-ADV2→ ADV: 刚才 *gang-cai* [just-just] 'just now, a moment ago'.

i. A1-A2→ ADV: 稍微 *shao-wei* [bit-bit] 'a little bit'.

j. V1-V2→ P or ADV: 按照 *an-zhao* [accord-toward] 'according to', 恐怕 *kong-pa* [afraid-afraid] 'afraid, perhaps, probably'.

(2) Compound Meaning = Root1 + Root2

a. N1-N2→ N, or N & V/A: 父母 *fu-mu* [father-mother] 'parents', 岁月 *sui-yue* [year-month] 'time', 江山 *jiang-shan* [river-mountain] 'land; country', 矛盾 *mao-dun* [spear-shield] 'contradiction, problem; contradictory'.

b. V1-V2→ V & N: 呼吸 *hu-xi* [exhale-inhale] 'breathe', 往来 *wang-lai* [go-come] 'come and go, contact', 升降 *sheng-jiang* [rise-fall] 'go up and down'.

c. V1-V2→ N: 开关 *kai-guan* [open-close] 'switch'.

d. A1-A2→ N: 大小 *da-xiao* [big-small] 'size', 高矮 *gao-ai* [tall-low] 'height', 长短 *chang-duan* [long-short] 'length', 黑白 *hei-bai* [black-white] 'black-and-white, right and wrong', 是非 *shi-fei* [right-wrong] 'right and wrong'.

(3) Compound Meaning = Root1

Some parallel compounds just have the meanings of their first components, and the meanings of the second components have been lost. Most such compounds are nouns.

a. Compound = N1: 国家 *guo-jia* [country-family] 'country', 家庭 *jia-ting* [family-yard] 'family', 窗户 *chuang-hu* [window-door] 'window', 质量 *zhi-liang* [quality-quantity] 'quality', 事情 *shi-qing* [things-feeling] 'things', 人物 *ren-wu* [person-thing] 'person', 眼睛 *yan-jing* [eye-eyeball] 'eye'.

b. Compound = V1: 忘记 *wang-ji* [forget-remember] 'forget'.

c. Compound = A1: 紧张 *jin-zhang* [tight-expand] 'nervous, tense'.

(4) Compound Meaning = Root 2

Contrary to Pattern (3), some parallel compounds only have the meanings of their second components.

a. Compound = N2: 兄弟 *xiong-di* [(elder-brother)-(younger-brother)] 'younger brother', 风景 *feng-jing* [custom-scene] 'scenery'.

b. Compound = V2: 打算 *da-suan* [hit-calculate] 'to plan', 打扫 *da-sao* [hit-sweep] 'to sweep', 打扮 *da-ban* [hit-makeup] 'to makeup'.

c. Compound = A2: 干净 *gan-jing* [dry-clean] 'clean'.

Generally, most of the parallel compounds have the same syntactic categories as their components do. An exception is the case where adjective antonyms form a compound and the result is a noun. Parallel compounds in which the two components are antonyms are also used to produce quadri-syllabic idiomatically fixed expressions. For instance, 古今中外 *gu-jin-zhong-wai* [ancient-modern-China-foreign] '(from) ancient (to) modern, and (from) China (to) other countries', 生死存亡 *sheng-si-cun-wang* [alive-die-exist-deceased] 'to live or die; life-and-death'.

6.2.4 Complex Compounds

Complex compounds are words containing two or more compounded types. Most of them are nouns in Chinese. For instance: 机器人 *ji-qi-ren* [(machine-machine)-person] 'robot' (parallel-endocentric), 吸尘器 *xi-chen-qi* [(suck-dust)-machine] 'vacuum cleaner' (exocentric-endocentric), 电冰箱 *dian-bing-xiang* [electric-(ice-box)] 'refrigerator' (endocentric-endocentric), 公用电话 *gong-yong-dian-hua* [(public-use)-(electric-speech)] 'public telephone, pay phone' ({exocentric-endocentric}-endocentric), 长途汽车 *chang-tu-qi-che* [(long-way)-(gas-vehicle)] 'long-distance bus' ({endocentric-endocentric}-endocentric). Mostly, the meanings of complex compounds are the compositions of their components. Thus, L2 learners can understand such compounds easily if the three basic types of Chinese compounds are made familiar to them. One problem for L2 learners of Chinese is that they must learn how to recognize the word boundary of complex compounds within a context. One important judgment is that no other words can be inserted into such compounds. For example, 公用电话 *gong-yong-*

dian-hua 'pay phone' is a compound, but 公用的电话 *gong-yong de dian-huan* [(public-use) DE (electric-speech)] 'a phone shared by some people (e.g. in an office)' is a phrase.

6.3 Productive Types of Chinese Compounds

As shown above, the structure patterns of Chinese compounds are many and complex. Some of them are productive, others are not. Of the productive ones, not all are equal in their productiveness. Through the productive patterns, new compounds are derived every day in Chinese people's lives, and the meanings of the new words can be inferred through contexts and word structure. While the end product may merely be trendy terms, which are likely to be ephemeral and not significant in language pedagogy; the process itself forms an important part of language acquisition strategy, which will be useful at all times.

The most productive patterns of Chinese compounds are endocentric compounds (except for the Object-Feature type) and exocentric compounds of the Action-Object, Action-Location or Action-Result semantic types. For example: 电巴 *dian-ba* [electric-bus] 'electric bus (without cables outside)' (Material-Object), 楼市 *lou-shi* [building-market] 'real-estate market'(Specific-Category), 冬钓 *dong-diao* [winter-fishing] 'to fish (with a hook) on ice' (Time-Action), 骑游 *qi-you* [ride-travel] 'to travel by bicycles' (Method-Action), 空嫂 *kong-sao* [space-(sister-in-law)] 'airline-hostess (not very young and married)'(Location-Object), 护哥 *hu-ge* [nurse-brother] 'male nurse in a nursing home'(Action-Actor), 热销 *re-xiao* [hot-sell] 'sell well' (Feature-Described); 泡吧 *pao-ba* [soak-bar] 'to dawdle in a pub' (Action-Location), 炒股 *cao-gu* [fry-stock] 'speculate in stocks' (Action-Object), 启动 *qi-dong* [set-move] 'to set up/to start (a program)'

(Action-Result). There are also a few parallel compounds in which the two components are synonyms: 罚没 *fa-mo* [fine-confiscate] 'to confiscate, to fine', 靓丽 *liang-li* [pretty-beautiful] 'pretty, beautiful', 挺升 *ting-sheng* [rise-raise] '(market price) rise up (strongly)'. Many new words are also complex compounds. For instance: 双休日 *shuang-xiu-ri* [double-(rest-day)] 'two-day weekend' 发烧友 *fa-shao-you* [(rise-fever)-friend) 'a fanatic fan (of sports, movies, music, etc.)', 新新人类 *xin-xin-ren-lei* [new-(new-(people-race))] 'the new new-generation, the youngest generation (in modern society)'. Some of those new words may look like abbreviations, but they do not have full forms. For instance, 电巴 *dian-ba* [electric-bus] 'electric bus (without cables outside)', 冬钓 *dong-diao* [winter-fishing] 'to fish (with a hook) on ice'. A few of them are old words but are used for new meanings, such as 启动 *qi-dong* [set-move] 'to start (a matching) → to set up (a program)'; 包装 *bao-zhuang* [wrap-pack] 'to pack (goods) → to design and makeup the appearance of a music star'.

6.4 Morphological Features

Since Chinese compounds are rich and complex, they have attracted a lot of attention in Chinese morphological and syntactic research. For example, as mentioned in Section 5.1.2, some previous studies have discussed whether the syntactic structure of Chinese compounds is the same as sentence/phrase structure (e.g. Ross 1985; Dai 1992, 1994; Liu 1990b; Tang 1994), whether Chinese compounds are level governed (Packard 1990, Sproat & Shih 1993), and whether Chinese compounds are right headed (Packard 1990, Starosta etc. 1998, Huang 1998). Since all the patterns of Chinese compounds have been listed in this chapter, a discussion of their morphological features is in order here.

6.4.1 Compound Structure and Phrase Structure

Chao (1968) states that in Chinese "most compounds are syntactic and only the relatively few cases of obscure relationships between the parts in compounds can be considered asyntactic" (p. 366). Tang (1994) argues that, in Chinese, word syntax and sentence syntax are one and the same. He analyzes compound verbs and their parallel syntactic constructions in Chinese and claims that both are "licensed by the same principles and parameters of universal grammar" (p. 523). The reason Tang gives is that the internal and external functions of Chinese compound verbs are the same as that of Chinese sentences.

Are Chinese compounds truly governed by sentence syntax? From the patterns and examples of Chinese compounds presented in this chapter, the relationships between compounds and phrases can be seen more clearly.

It has been shown in this study that the internal structures of Chinese compounds are Modifier-Head, Subject-Predicate, Predicate-Object, Predicate-Complement, and Coordination. Each pattern is parallel to a syntactic construction of the Chinese sentence. Thus, it is true that the internal structures of Chinese compounds and that of the sentence are the same. It is also mentioned in section 6.2.2 that most Predicate-Object compounds can only serve as intransitive verbs. These compounds cannot take an object NP after them in a sentence because the verbal component has already assigned an object case to the nominal component. This follows the Theta-theory: a theta-role is assigned to one and only one argument. Thus, to some degree, the external functions of Chinese compounds are also governed by the principles of sentence syntax. Nevertheless, compounds are not equivalent to phrases. First, the meaning of a phrase is the

composition of its constituents, but the meaning of a compound may not. Second, a phrase structure is not tightly bound, in the sense that other words or constituents can be inserted into it. But a typical compound is a meaningful whole and usually does not allow insertion within its boundary without losing its integrity. Third, compounds are words, and their syntactic structures are not always head-governed or level ordered as phrase structures are even when the structural patterns are similar (to be discussed in the next section in detail). Fourth and finally, compounds have a constraint on the number of syllables: A typical compound usually does not contain more than three syllables; but a phrase does not have such a constraint. However, as mentioned at the beginning of this chapter, there is not a clear-cut division between Chinese phrases and compounds. Some compounds, of which the meanings are lexicalized and the structure is bound, are more typical of words; but some, such as Predicate-Object verbs which allow insertions (discussed in section 6.2.2) are more like phrases.

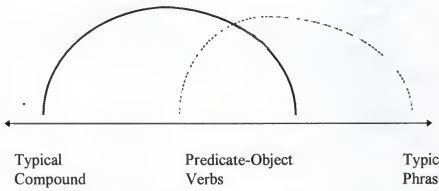

Figure 6.1. Scopes of Chinese Compounds and Phrases

Figure 6.1 above shows that the domains of compounds and phrases overlap, and that some constructions in Chinese have features of both compounds and phrases.

6.4.2 Chinese Compounds and the Right-hand Head Rule (RHR)

The term "head" in morphology is borrowed from the theory of phrase structure, the X-bar theory in Chomsky's Government-Binding (GB) syntactic theory. A phrase can be analyzed as a level structure, and the X syntactic category is the head of the phrase:

a) Phrase X''→ Spec, X'; b) X'→ X, (YP) (ZP)

Williams (1981) applies X-bar theory to word structure and argues that we should regard the verb root *stand* as the head of *withstand*, and its features will also percolate up to the dominating node giving the complex verb *withstand*. He further claims that all words are headed, and that the head is the right-most morpheme of the construction. This statement is known as the Right-hand Head Rule (RHR).

However, many counterexamples to the RHR have been found in different languages, implying that the rule may only be language-specific. For example, Lieber (1980) claims that in Vietnamese all compounds are left-headed, e.g. *nha thuong* [establishment be-wounded] 'hospital'. In spite of the counter-evidence, 'head' and X-bar theory are widely accepted in word analysis. Lieber (1992) claims that there are no morphological rules, and all morphological structures are head-structured and can be explained by syntactic principles. Hacken (1994) also argues that all compounds are head compounds, "H(head)-compounding is equal to compounding"(p.136). With regard to word formation in Mandarin Chinese, Packard (1990) and Starosta et al. (1998) also claim that Chinese compounds are right-hand headed. By checking through all the patterns of Chinese compounds presented so far, however, this study finds that not all Chinese compounds are right-hand headed and not all of them are even headed.

As shown in Section 6.2.1, it is true that most Chinese endocentric (Modifier-Head) compounds are right-hand headed. That is, the syntactic features of such compounds are the same as those of their right-hand components. If the right-hand component is a noun, the compound is also a noun; if the component is a verb, an adjective or an adverb, the compound is also a verb, an adjective or an adverb respectively. Despite this general tendency, there are still a few endocentric compounds that are not headed, and the syntactic features of the compounds are not the same as any of their components. For instance: 新闻 *xin-wen* [new-hear] 'news', 冷饮 *leng-ying* [cold-drink] 'cold drink/beverage', 小吃 *xiao-chi* [little-eat] 'dim sum, snack', and 软卧 *ruan-wo* [soft-lie] 'soft berth' are all nouns, but their components are adjectives or verbs; 会 议 *hui-yi* [meet-talk] 'meeting, conference' is also a noun, but both its components are verbs. Moreover, as shown in Section 6.2.1, the Object-Feature semantic type of Chinese endocentric compounds are left-hand headed, and the syntactic features of such compounds are the same as their left-hand components.

In Chinese exocentric compounds, the Subject-State pattern is right-hand headed. But the Actor-Action pattern is more complex. Some of its compounds are also right-hand headed, but some other, such as 神往 *shen-wang* [spirit-go] 'be charmed, be enchanted' and 自动 *zi-dong* [self-move] 'automatic', do not have a syntactic head because the syntactic features of the compounds are different from those of their components. The patterns of State-Object and Action-Location are both left-hand headed. Many Action-Object compounds (i.e. V1-N2 → V) are also left-hand headed, but some of them (i.e. V1-N2 → N/A) are unheaded. Action/State-Result compounds may also be treated as having a left-hand headed structure.

Parallel compounds can be regarded as headless ones, because the two components in such compounds are coordinate and have the same syntactic features. In general, the syntactic features of such a compound is the same as those of either one of its roots. But in a few cases, the syntactic category is different from both its components (e.g. V1-V2 → N, A1-A2 → N).

Lieber (1992) and Hacken (1994) treat exocentric and parallel/coordinate compounding either as derivations with an empty (zero) affix or as lexemes listed in the lexicon. With regard to Chinese word formulation, their treatment will cause problems.

First, if Chinese Modifier-Head words are compounds, there is no reason to exclude exocentric and parallel structure words as compounds, since all of them are also Root-Root combinations. Second, if compounds which are not right-hand headed are derivations with an empty affix, it cannot be explained 1) why different syntactic features of different compounds are all marked by an empty or zero affix, and 2) how an empty/zero affix can tell what syntactic features a compound should have. Third, if exocentric and parallel compounds are lexemes, these two patterns should be undecomposeable, and thus, unproductive. In fact, Chinese exocentric and parallel compounds can be easily decomposed, and Section 6.3 of this study shows that Action-Object, Action-Location and Action-Result patterns of the exocentric compounds are some of the most productive patterns in Chinese. Moreover, as shown by the examples in Section 6.2.2, the meanings of many exocentric compounds can also be derived from their components and are not as highly lexicalized as typical lexemes.

According to the statistics of Huang (1998), in Mandarin disyllabic compounds, about 89.7% of nouns, 57.8% of verbs and 62.7% of adjectives are right-hand headed.

All the others are either left-hand headed or headless. Therefore, the RHR cannot apply to Chinese compounds.

The above discussion, however, does not necessarily lead to the conclusion that no generalizations can be derived from the facts about the structure of Chinese compounds. In fact, there are general tendencies for Chinese compounds. Modifier-Head and Subject-Predicate compounds tend to be right-hand headed, Predicate-Object and Predicate-Complement compounds tend to be left-hand headed. Coordinate (Parallel) compounds are a non-issue, since it does not matter whether they are recognized as left-head or right-hand headed. These tendencies exactly match the syntactic structures of Chinese phrases. The difference is, as presented above, that in each compound structure pattern, there are some headless compounds. They are not head-governed, and their syntactic features are not percolated from their components. Thus, such compounds cannot be analyzed as level-ordered as phrase structures are, and thus are not governed by the theory of sentence syntax (e.g. X-bar theory and Case theory). Therefore, the external functions of Chinese compounds are not as straightforward as Tang (1994) claims them to be, i.e. governed by syntactic principles. What can be said is that although a majority of Chinese compounds are headed and can be explained by the syntactic principles of phrases, there are simply too many exceptions that cannot be subsumed under those rules. These exceptions deserve just as much, if not more, attention in theoretical as well as practical studies. All this constitutes a strong reason for presenting the compounds the way we did in Sections 6.1-6.3.

6.5 Conclusion

Chapter Five and the current chapter have presented the types of Chinese words in detail: mono-morphemic words, reduplications, affixed words and compounds, with abbreviations as a special type. It has been shown that semantic content, syntactic function and, if applicable, word formation for each type are all governed by some general rules. These rules can help L2 learners of Chinese understand the structure of a Chinese word that leads to its meaning and syntactic function. More detailed conclusions are provided below:

1. As monomorphemic words cannot be decomposed, each of them has to be acquired as a whole. A knowledge of character structure and radicals can help L2 learners of Chinese acquire the words encountered in reading.
2. Reduplications consist of three types: nominal, verbal (action-verb), and adjective (state-verb). Except for kinship terms, nominal reduplications are usually formed from monosyllabic measure-words/classifiers and monosyllabic nouns which can be used as measure-words/classifiers contingently. Such nominal reduplications always mean 'every N'. Nominal parallel compounds N1-N2 (N1 and N2 are antonyms) which refer to locations may also be reduplicated in an N1N1N2N2 pattern to mean 'every N1 and N2' or 'all of N1 and N2'. Verbal reduplication VV or V1V2V1V2 (V1 and V2 are the two components of a compound) is reduplicated by monosyllabic action verbs or disyllabic verbal compounds with a parallel structure. Such reduplication means 'try to V' or 'V a little'. If a 看 *kan* 'look' is added at the end, the

meaning 'try to V' is highlighted. A parallel verbal compound with the meaning of 'V1 and V2' (i.e. V1 and V2 are not synonyms) can also be reduplicated as V1V1V2V2 pattern. The meaning is 'to do V1 and V2 repeatedly'. Adjective reduplications are a little complicated. A monosyllabic adjective can be reduplicated to describe a state or feature vividly. A parallel compound may be reduplicated as AABB to increase the degree of a state or feature (when the components A and B are synonyms), or to mean 'some are A and some are B (when A and B are antonyms). A Modifier-Head compound may also be reduplicated as ABAB to increase the degree of a state or a feature. However, not all of Chinese adjective compounds with a parallel or endocentric (Modifier-Head) structure can be reduplicated. Moreover, all Chinese adjective reduplications cannot be modified by degree adverbs.

3. There is a relatively large mumber of affixes in Chinese. 阿 *a* (to form disyllabic intimate terms), 老 *lao* (to form disyllabic nouns or to form colloquial addresses and ranks), 第 *di* 'rank-', 其 *qi* 'its-, that-', 以 *yi* 'from-', 当 *dang* 'just at-' are common prefixes which are always attached to nouns. 可 *ke* 'able-' and 不 *bu* 'not-, un-' are common prefixes which are attached to verbs and adjectives (state verbs). 子 *zi* (after some monosyllabic nouns, adjectives and verbs to form disyllabic nouns), 儿 *-r* (to add a phonological ending to some nouns), 头 *tou* (after some monosyllabic nouns, localizers, action verbs or state-verbs to form nouns), 生 *sheng* '-person, -er', 士 *shi* '-person, -er', 员 *yuan* '-person, -er', 者 *zhe* '-person, -er', 家 *jia* '-ist', 们 *men* 'plural for people in general', 性 *xing* '-ity, -ness', and 的 *de* 'possessive

marker or nominal marker' are nominal suffixes which always form nouns. 化 *hua* '-ize' is a derivative verbal suffix. 了 *le*, 着 *zhe*, 过 *guo*, 地 *de*, 得 *de*, 起来 *qilai* are inflectional verbal suffixes which mark Chinese aspects, and they have been discussed in many studies of Chinese grammar. 哩 *li* is a common infix which is inserted into a disyllabic derogatory term to form a vivid reduplication.

4. Chinese abbreviation is a device to shorten long expressions, prototypically, by keeping the first syllable of words in a nominal phrase, a verbal phrase or a proper noun. Affixes and verbal or adjectival modifiers in nominal compounds are not selected to form an abbreviation. Monosyllabic historical names of provinces and large cities are used as shorter alternatives to refer to an area covering more than one place.
5. Chinese compounds can be recognized as having three major types: endocentric, exocentric and parallel compounds. The semantic relationships of compounding components can be used as an important guidance to reach the meanings of compounds. The syntactic structures of Chinese compounds are largely the same as those of Chinese phrases. However, Chinese compounds and phrases are not one and the same, even though there is no clear-cut demarcation between them. Prototypical compounds are more lexicalized and usually cannot have other words inserted into them. Some of them are highly bound units, their meanings and syntactic features cannot be derived directly from their components. Less prototypical compounds, however, are more like phrases. Not only can their internal structures be analyzed by syntactic rules,

but also they may even contain insertions of other words or phrases (e.g. Predicate-Object verbs). In Chinese vocabulary pedagogy, highly lexicalized compounds can be treated as whole units, the others, especially less typical compounds, should be decomposed and analyzed by general semantic and syntactic rules.

Since compounds constitute the greater part of Chinese words, they have to be focused in Chinese vocabulary teaching and learning. As presented and discussed in this chapter, Chinese compounds contain properties of both words and phrases. Such properties should be a focus of vocabulary pedagogy. On the one hand, the meanings of a lot of Chinese compounds can be derived from their components and the semantic relationships of components, and their internal structure are the same as that of Chinese phrases. Thus, L2 learners should be trained to analyze the structure and the semantic pattern of a compound in order to get the meaning and syntactic function of it by themselves in language exposure. Thus, they can acquire Chinese words more effectively. On the other hand, a certain number of Chinese compounds may be more lexicalized, and their meanings and syntactic functions cannot be derived directly and easily from those of their components. At this time, L2 learners must also adopt enough context information to infer the meaning of such a compound. A few highly lexicalized compounds are better learned as a whole as mono-morphemic words. A continuum pedagogy will be discussed in Chapter Eight.

CHAPTER 7
MEASURES AND LOCALIZERS

In Modern Chinese, when a noun is preceded by a numeral or a demonstrative pronoun, a measure word (also called "classifier" by some grammarians)[1] is needed immediately in front of the noun. Different nouns are paired with different measure words. To learn this complex system is a tremendous task for L2 learners in their Chinese study. The collocation between a noun and a measure word, however, is not decided by rigid grammar rules but by the semantic features of the particular objects or concepts represented by the noun. The use of nouns is further complicated by another fact. Except for intrinsic place-words such as names of places or countries, a common noun can also be used to denote a location, but it is generally followed by a localizer in such a case. Even though localizers are required for syntactic reasons rather than for semantic purposes (Chu 1983), the collocation between localizers and their cooccurring nouns is likewise governed by cognitive semantic features of each particular situation. In this chapter, the general principles of different measure words and localizers are discussed through the analysis of their cognitive meanings.

Note: 1. In this study, "classifier" only refers to a word which assigns nouns or verbs to a specific category by their semantic features or cognitive meanings; "measure word" refers to any word (including a classifier) directly located between a numeral/demonstrative-pronoun and a noun or verb to modify an object or a concept (see the following section).

The guiding theory of our analysis is the five basic claims presented by Langacker (1988, p. 49-50) about the nature of linguistic meaning:

Thesis A: Meaning reduces to conceptualization (mental experience).
Thesis B: A frequently-used expression typically displays a net-work for interrelated senses.
Thesis C: Semantic structures are characterized relative to "cognitive domains".
Thesis D: A semantic structure derives its value through the imposition of a "profile" (designatum) on a "base".
Thesis E: Semantic structures incorporate conventional "imagery", i.e. they construe a situation in a particular fashion.

This theory points out that linguistic meanings are presented in people's cognition as networks which are characterized as categories. Moreover, a category is derived through some prototypical values, and less prototypical situations are categorized by particular imageries extended from the central zone. To find the collocational principles between Chinese measure words or localizers and their nouns is to find the cognitive values and governing categories of each measure word and each localizer. The cognitive values, as shown in the following analysis, form a network which is governed by (and defines) categories.

7.1 Measure Words

Measure words are used in every language for denoting measures such as weight, distance, value, etc. For instance, "meter", "gram", "kilogram", "liter", "dollar", "pound" are measure words in English. The difference is that in Chinese, measure words denote not only measures but also categories for nouns and verbs. (Verbs in Chinese may also be described by numerals and measures, though less often than nouns). There are hundreds of measure words in Modern Chinese, and they can be generalized into five groups: 1) standard measures, 2) classifiers for nouns, 3) classifiers for verbs, 4) quasi-measures, and

5) temporary measures. Measures only denote quantities of objects or concepts, classifiers describe cognitive features of objects or concepts. Some classifiers may mainly denote quantities or amounts as measures do, but they must also indicate some other features (such as shape, state, material, etc.) of objects/concepts that simple measures cannot indicate.

7.1.1 Standard Measures

Standard measures are words which denote length, capacity, weight, area, time, temperature and currency. For example, 公里 *gong-li* [metric-LI] 'kilometer', 米 *mi* 'meter', 升 *sheng* 'liter', 公斤 *gong-jin* [metric-JIN] 'kilogram', 两 *liang* 'a Chinese unit equivalent to 50 grams', 分 *fen* 'minute; cent', 度 *du* 'degree', 角 *jiao* 'dime', 元 *yuan* 'dollar'. Standard measures in Chinese are a closed set, to which no new words can be added unless new measures are added in life. Many of them are translated terms of international measures. Since each of the Chinese standard measures easily corresponds to a measure in most foreign languages, they are not difficult to learn and do not need any further discussion.

7.1.2 Classifiers for Nouns

Classifiers for nouns are special measure words which categorize nouns by their physical or functional-perceptual properties. They are, however, not a unique feature of Chinese. Classifiers are also used in many other Oriental languages (such as Thai, Vietnamese, and Japanese), African languages (like Bantu), Australian languages and some Amerindian languages. Even in English, classifiers are also found, for example, a *loaf* of bread, a *piece* of paper, a *head* of cabbage, though they are few in number and are only required for certain nouns. In Chinese, there are many classifiers, and they are

required for any noun that is modified by a numeral or a demonstrative pronoun. Different nouns are collocated with different classifiers. "The relationship between noun and classifier in classifier languages is typically explicable, but not always predictable without extensive knowledge of the relevant language" (Allan 1977, p. 294). A few works have studied Chinese classifiers, but none of them have clearly shown why specific classifiers only categorize certain nouns. Chao (1968, Section 7.9) lists some common Chinese classifiers and gives some nouns as examples to go with them. Yet, no detailed explanations are given for their collocations. Among the researchers, Tai (1994) is the first one to analyze Chinese classifiers by their cognitive meanings, but his work focuses on the discussion of general cognitive theories and only a few classifiers (e.g. 枝 *zhi* and 根 *gen*) are analyzed to illustrate theoretical points. For lack of a comprehensive study of the Chinese classifiers that is readily applicable to CSL/CFL, we will turn to a cognitive approach for our purpose.

According to the cognitive theory mentioned above, world knowledge comes as structured information rather than as arbitrary or unpredictable attributes. Items in structured information appear in people's cognition as category systems which "provide maximum information with the least cognitive effort" (Rosch 1978, p. 28). Classifiers constitute a system that categorizes nouns by perceptual properties. Thus, if the perceptual properties can be identified, there is a good chance that the collocational principles of classifiers and nouns may follow naturally.

Allan (1977) claims that classifiers in all languages fall under seven general categories: material, shape, consistency, size, location, arrangement, and quanta. Tai (1994) claims that Chinese classifiers can be assigned five categories: animacy, shape,

consistency, size, and parts of objects. Wiebusch (1995) argues that "the bipartition between animacy and inanimacy is not very appropriate for (Chinese) classifiers" (p. 8) because all Chinese classifiers shared by animals and humans are also used with inanimate objects. He differentiates Chinese classifiers into three major categories: type (kind/function), quality (shape/consistency/size), and composition (complexity/part of set/part of object). In fact, classifiers in Modern Chinese are more complex. All the seven categories discussed by Allan (1977) occur in Chinese, and there are also others like time, location and instrument. Many Chinese classifiers are distinguished from each other in more than one way and can be included in two or more categories. Very often, there is not a clear-cut boundary between neighboring categories. In this study, the following categories are proposed for Chinese classifiers: Arrangement, Division, Instrument, Location, Part of Object, Quality (shape/size/consistency/material), Quanta, Synonym, Time, and Type. Among them, the concepts of "arrangement", "location" and "quanta" are borrowed from Allan (1997), the explanation of "part of object" is the same as in Tai (1994). All the others are new categories used in this study. Classifiers with the value of more than one category are only discussed in one major category but the functions belonging to other categories are also mentioned. A few classifiers cannot be put in any category above, and they are discussed as "Others" at the end. In each category, the cognitive meanings of a few classifiers are given as examples. Those classifiers usually have complex cognitive values and can be explained by the cognitive theory discussed above: the cognitive classification of a classifier is derived through a prototypical perceptual property, and such property may be extended to less prototypical values to

form a network. All the other classifiers with simple cognitive meanings are listed in Appendix D.

(1) Arrangement

Many objects in Modern Chinese are classified by the methods they are handled or arranged with. The classifiers used for this purpose are derived from verbs. In a noun phrase of the form "numeral/demonstrative-M-N", the classifier actually signifies a resulting state. Such classifiers can thus be grouped together under "arrangement". Common arrangement classifiers are 串 *chuan* 'string, bunch', 包 *bao* 'bag, box', 顶 *ding* 'top', 堆 *dui* 'heap, pile, stack', 发 *fa* 'sending out, shooting', 封 *feng* 'sealing', 截 *jie* 'section', 卷 *juan* 'roll', 束 *shu* 'bundle, bunch', and 套 *tao* 'suit, set'. E.g.:

截 *jie* 'to cut → section' classifies objects which are cut in a certain length or section: 两截木头 *liang jie mu-tou* [two section log] 'two chunks of log'.

套 *tao* 'to cover (over); to slip over' is the classifier for suits of clothes. From this basic function, 套 *tao* is extended to classify objects which are in suites or sets, but the pieces may be in different shapes, sizes or functions: 一套餐具/房间/家具/书 *yi tao can-ju/fang-jian/jia-ju/shu* [one set meal-utensil/room-space/home-utensil/book] 'a set of dinnerware /a suite of rooms /a suite of furniture /a series of books'. Figure 7.1 is the classification network of 套 *tao*. A vertical line indicates the functional category of a classifier, a thick arrow ⟶ represents the application for a given function, a thin arrow ⟶ marks an extension of a basic function/meaning or of an upper-level function/application. The symbolic meanings are the same in other figures in this section. In Figure 7.1, 套 *tao* is a classifier applied to suits of clothes through arrangement, and

this is its basic function. The notion 'suit' for clothes is extended to other objects like dinnerware, rooms, furniture, books, etc.

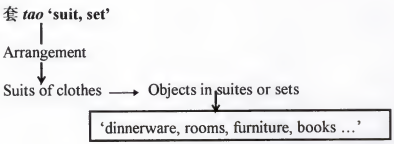

Figure 7.1 Classification network of *Tao*

(2) Division

Some objects, events or concepts are divided into different sections, parts or periods. Several classifiers, such as 层 *ceng* 'layer, tier', 段 *duan* 'section, part', 份 *fen* 'share, portion', 号 *hao* 'number', 节 *jie* 'section, length', 届 *jie* 'session', and 集 *ji* 'collection, volume, part' are used to name such divisions. Classifiers of this sort are more like simple measures and are at the border between classifiers and measures. E.g.:

段 *duan* 'section, part' classifies time, objects or abstract concepts which can be divided into sections, periods or parts: 一段时间 *yi duan shi-jian* [a section time] 'a period of time', 两段文章 *liang duan wen-zhang* [two section writing] 'two passages/paragraphs of a writing'.

节 *jie* 'joint; node; knot → section; length'. The sections indicated by 节 *jie* are usually linked or jointed together. This is the difference between 节 *jie* and another classifier 截 *jie* (see the analysis of 截 *jie* in Arrangement). For instance, 九节车厢 *jiu jie che-xiang* [nine section vehicle-box] 'nine railway coaches', 三节课 *san jie ke* [three section class] 'three (periods of) classes'.

(3) Instrument

A few Chinese classifiers are instruments of doing or dealing with the objects they classify. 笔 *bi* 'writing instrument; pen' and 幕 *mu* 'curtain, screen' are common ones. 笔 *bi* is frequently used with 一 *yi* 'one' to modify written characters which are well executed (by someone): 他写 一笔好字 *Ta xie yi bi hao zi* [he write one pen good characters] 'he writes a good hand'. From the original meaning of 笔 *bi* "writing instrument", a new meaning 'character stroke' is derived. Then, from this meaning, it refers to 'score' (i.e. a record done in writing) and becomes the classifier of money, bills, and debt: 两笔钱 /账 /债 *liang bi qian / zhang / zhai*[two stroke money/ bill/ debt] 'two scores of money/ bills/ debts'. Figure 7.2 shows the network of classified categories of 笔 *bi*.

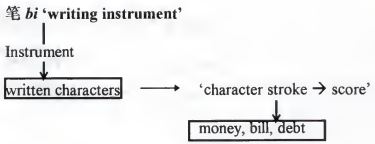

Figure 7.2 Classification network of *Bi*

(4) Location

Some classifiers in Modern Chinese refer to the place where objects are usually located. The common ones are 场 *chang* 'field, ground', 处 *chu* 'place', 台 *tai* 'stage', 堂 *tang* 'hall, main room', 所 *suo* 'place', 位 *wei* 'site, seat', 座 *zuo* 'seat, place'.

场 *chang* '(large) field, ground' is the classifier for ball games, speeches, shows, movies, stage plays and other performances, in-classroom tests, wars and weather

phenomena like rain, wind, fog and snow. All these events occur or result on a large field/ground/area. Since ball games, speeches and performances are competitions, movements or activities, 场 *chang* is extended to classify competitions and related events like debates, discussions, and quarrels. Revolutions, fights, rebellions, and struggles are all events related to violence, they take war as the prototype and are also classified by 场 *chang*. Figure 7.3 shows the extended uses of 场 *chang* as a classifier.

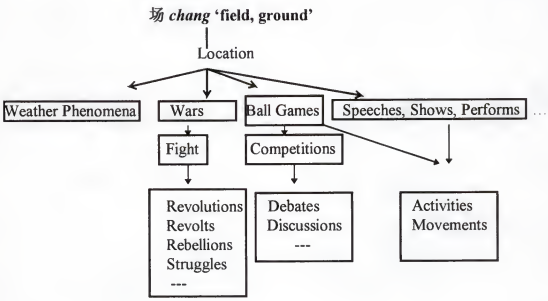

Figure 7.3 Classification network of *Chang*.

台 *tai* 'stage; table' is the classifier for stage plays, shows and other performances which occur on stages. As mentioned above, 场 *chang* may also classify such events. 场 *chang* refers to a performance or showing, but 台 *tai* counts the unit of the play or show itself. E.g.: 这两台戏, 他们各演了三场. *Zhe liang tai xi, ta-men ge yan-le san chang* [this two TAI plays, he-plural each perform-LE three CHANG] 'They gave three

performances of each of the two plays'. Since 台 *tai* also means 'table', it is extended through "shape" to classify all kinds of large-sized machines which stand up in three-dimensions, such as machines, engines, radios, cameras, computers, printers. Figure 7.4 is the classification network of 台 *tai*.

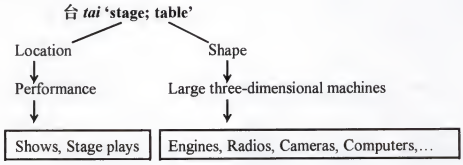

Figure 7.4 Classification network of *Tai*

(5) Part of Object

Some classifiers in Modern Chinese are the parts of objects they classify. Such as 把 *ba* 'handle', 栋 *dong* 'ridge-pole', 杆 *gan* 'pole, the shaft or arm of something', 户 *hu* 'door', 架 *jia* 'frame, rack', 口 *kou* 'mouth', 扇 *shan* 'door, board or (window) casement', 头 *tou* 'head', 尾 *wei* 'tail', 盏 *zhan* 'small cup', and 株 *zhu* 'tree trunk'. For example:

把 *ba* 'handle' classifies objects which have a handle. Many of them are instruments, such as spoons, knives, umbrellas, rulers, teapots, hammers, saws, axes, screwdrivers, bottle openers, hand guns, and chairs (a chair has a back or arms which can serve as handles).

口 *kou* 'mouth' is the classifier for people in a family. E.g.: 我家有四口人 *wo jia you si kou ren* [I family have four KOU people] 'there are four people in my family'. It is

also used as a classifier for containers with some depth. For example, well, water-vat, and caldron. This is an extended value of the original meaning by image. Figure 7.5 shows the cognitive values of 口 *kou*.

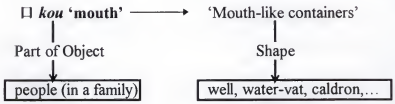

Figure 7.5 Classification network of *Kou*

(6) Quality

Many Chinese classifiers are used to describe the shapes, size, consistency or materials of objects. For example, 条 *tiao* 'strip', 道 *dao* 'line, road', 列 *lei* 'row, line', 排 *pai* 'row, line', 根 *gen* 'root', 枝 *zhi* 'branch', 股 *gu* 'strand, skein', 张 *zhang* 'to spread, stretch, open', 面 *mian* 'face, surface', 幅 *fu* 'width of cloth', 块 *kuai* 'piece', 片 *pian* 'thin piece, slice', 团 *tuan* 'round', 滴 *di* 'drop', 丸 *wan* 'small ball, pellet', 粒 *li* 'grain', 颗 *ke* 'small and round things'. The following are some examples.

条 *tiao* 'strip' is used as a classifier for objects which are long and winding in shape: street, scarf, bench, river, trousers, leg, snake, fish, dog, etc. Since skirts and shorts are clothing for the lower part of the body, they group around trousers and also take on 条 *tiao* as their classifier. 条 *tiao* is also the classifier for some abstract things such as news, rules and principles. The reason is that when news, rules or principles are written down on papers, they appear as lines in time or space. Figure 7.6 is the network of its classified categories.

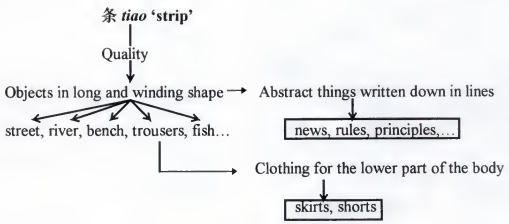

Figure 7.6 Classification network of *Tiao*

道 *dao* 'line, road, path' is used as a classifier applying to objects that resemble a line in one's perception, e.g. light, river, and scar. In such cases, 条 *tiao* can also be used instead of 道 *dao*. By metaphorical extension, successive doors and walls that one encounters on one's way are treated as lines and are classified by 道 *dao*. For example, 两道门 *liang dao men* [two line door] 'two successive doors', 三道手续 *san dao shou-xu* [three line procedure] 'three steps in a procedure', 四道菜 *si dao cai* [four line dish] 'four courses (of a meal)'. Moreover, like 条 *tiao*, 道 *dao* can also classify abstract nouns like news, questions, orders, and laws, presumably since these concepts can be printed or written out as lines. 条 *tiao* can classify most of the nouns described by 道 *dao*, but the reverse is not true.

张 *zhang*, 面 *mian*, 幅 *fu* are all classifiers for objects with a flat surface. Their differences are in functions and materials. 张 *zhang* means 'to spread, to stretch, to open'. Under the classification of 张 *zhang*, the objects must have the function of supporting solid objects on their flat surface on the top. For example, table, stool, bed, paper, photo, picture, face and so on. A table or a desk is for objects to be placed on, a stool or bed is

for people to sit or lie on, and a piece of paper is also for writing or printing something on. All objects of paper, such as checks, bills, paper money, pictures and photos, cluster around paper and are in the same category (张 *zhang*). On a face, there are features such as eyes, mouth and nose. Thus, a face is also classified by 张 *zhang*. The classifier 面 *mian* means 'face; surface'. Its classifying function is to highlight the flat surface of an object. The cognitive basis of this function is the disregard of the third dimension of the object and the highlighting of the importance of the remaining two-dimensional surface. For example, wall, mirror, drum, and flag all have their two-dimensional surface made conspicuous either in function or in appearance. The classifier 幅 *fu* 'width of cloth' classifies large flat objects of which the material is cloth or paper, e.g. large paintings, pictures, maps, and yard goods. In some extensions, this category overlaps with that of 张 *zhang*, and, thus, some nouns like picture, painting and map can be classified by either 张 *zhang* or 幅 *fu*. Figure 7.7 shows the classification network of 张 *zhang*.

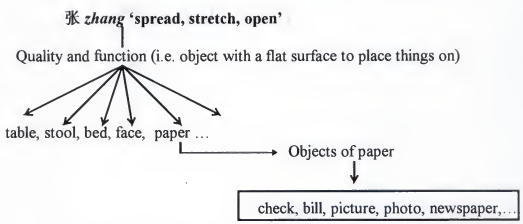

Figure 7.7 Classification network of *Zhang*

(7) Quanta

Some classifiers describe objects by quantity. Examples are 打 *da* 'dozen', 对 *dui* 'pair (be opposite)', 双 *shuang* 'pair', 副 *fu* 'set', 帮 *bang* 'gang', 伙 *huo* 'mess, group, crowd', 群 *qun* 'group, school', 批 *pi* 'batch, lot, group', and 只 *zhi* 'single, only'. Among them, the cognitive values of 对 *dui*, 双 *shuang*, 副 *fu*, and 只 *zhi* are complex, and they are analyzed in the following.

对 *dui* is "pair, (classifier of) pigeons, eyes, husband and wife, earrings" (Chao 1968, p. 595); 双 *shuang* is "pair, (classifier of) eyes, chopsticks, socks, stockings" (Chao 1968, p. 595). So far, no study has tried to distinguish the difference between them. In fact, the difference between them lies in the cognitive frames in people's minds. The collocations of the two classifiers and the nouns after them are decided by the different perceptual properties of objects.

对 *dui* basically means "to be opposite". When 对 *dui* is used as a classifier, it refers to 'two entities in opposition to each other'. Therefore, the nouns after it should be objects appearing in pairs but being opposite in gender, position, or function (to be antonyms): parents, husband and wife, son and daughter (of a family), ears (on a head), wings (of a bird), pillows (side by side on a bed), earrings, chairs (on each side of a small table), and word "contradiction". From classifying couples of people in different genders, 对 *dui* is extended to classify people who are in pairs but are the same gender. For example: 一对同性恋 *yi dui tong-xing-lian* [one DUI same-gender-love] 'a homosexual couple', 一对选手 *yi dui xuan-shou* [one DUI select-hand] 'a pair of athletes (face to face in a competition)', 一对双胞胎 *yi dui shuang-bao-tai* [one DUI twin] 'a set of twins'. The cognitive categories of classifier 对 *dui* are presented in Figure 7.8.

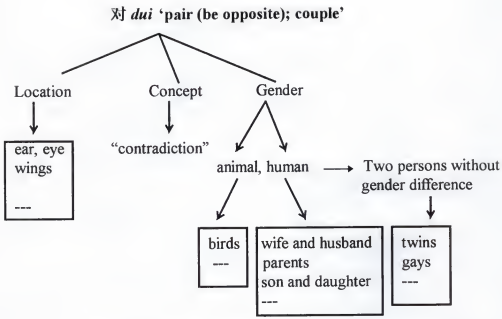

Figure 7.8 Classification network of *Dui*

双 *shuang* is typically used to classify objects which are used or located in pairs. Nouns like shoes, chopsticks, gloves, socks, stockings, hands, feet, legs, arms, shoulders, eyes and eyebrows all can follow 双 *shuang*. The difference between 对 *dui* and 双 *shuang* is: 对 *dui* classifies paired objects located in opposing or facing positions while 双 *shuang* classifies paired objects located side by side. A pair of ears and kidneys are always separated by a body part and located on opposite sides of it, thus, they can only be classified by 对 *dui*. A pair of hands, feet or legs, though separated, can be brought together and they are more appropriately classified by 双 *shuang*. Other nouns like shoulders, eyes, or eyebrows may be classified by either of them. If 对 *dui* is used, the separated location of such organs is the focus in a speaker's mind (i.e. the arms are at opposite sides of a body, the shoulders are separated by the neck, the eyes and eyebrows are on the opposite sides of the face). When 双 *shuang* is used, the separated locations of

the pair are ignored in favor of their functioning together as a pair. Moreover, 双 *shuang* usually cannot classify people and animals which are in couples or pairs.

副 *fu* means 'set'. It classifies small daily-used objects which are used as sets of tools (more than one piece but not necessarily two) and all pieces are in the same shape, size or function. For example: eye glasses (the two lenses are the same size and are fixed on a frame together), gloves, bracelets, earrings, chess, playing cards, etc. Some of the objects, such as gloves, bracelets and earrings, are also in pairs and are worn by hands or organs locating at opposite sides of the body; therefore, they are generally classified by 副 *fu* but can also be classified by 双 *shuang* (for gloves) or 对 *dui* (for bracelets and earrings). The difference between 副 *fu* 'set' and another classifier 套 *tao* 'set; suite' is that 套 *tao* only classifies large objects which are in sets or suites but all pieces are not necessarily the same in shape, size, content or function. Furthermore, 副 *fu* is also used to categorize appearances and manners of humans assumed for specific purposes, but 套 *tao* cannot. For example: 一副笑脸 *yi fu xiao lian* [one set smile face] 'a smiling face', 一副哭相 *yi fu ku-xiang* [one set cry-appearance] 'a crying face', 一副官腔 *yi fu guan-qiang* [one set official-tone] 'a bureaucratic tone'.

只 *zhi* is a very common classifier in Chinese. It means 'single, only' in Modern Chinese; thus, it classifies objects as individuals (generally, as members of a pair or group): 一只手 *yi zhi shou* [one ZHI hand] 'one hand', 两只鞋 *liang zhi xie* [two ZHI shoe] 'two shoes (may be from two different pairs)', 三只眼睛 *san zhi yan-jing* [three ZHI eye] 'three eyes'. In classical Chinese, 只 *zhi* originally means 'one bird'; thus, it is also the classifier for small animals like birds, cats, chickens, ducks, and, by extension, dogs, insects, etc. Another function of 只 *zhi* is to classify small containers like suitcase, box,

bottle, bowl, pot, pan, cup, tray, plate, dish, etc. Figure 7.9 shows the categories of classifier 只 *zhi*.

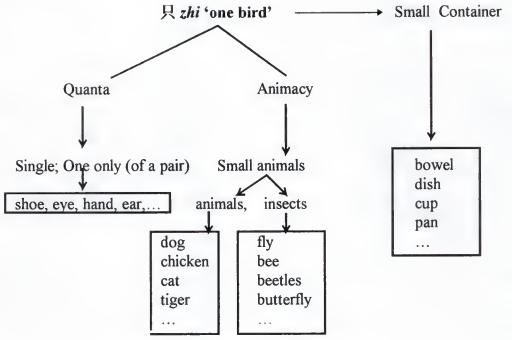

Figure 7.9 Classification network of *Zhi*

Besides the quanta classifiers listed above, many objects in Chinese can be classified for quantity by the container they are placed in. Some common containers which are frequently used as classifiers are bottle, cup, bowl, plate, page, nest, and so on. They are also nouns in their own right, but in some sense they are "borrowed" temporarily as classifiers. Thus, they can be termed "temporary" classifiers or measures. They will be discussed in Section 7.1.5.

(8) Synonym

Some classifiers were originally also the names of the objects they classify, but later, they became specific classifiers in Modern Chinese. They are 间 *jian* 'room' for

rooms, 本 *ben* 'book' for books, 册 *ce* 'book' for books, 篇 *pian* '(finished) article' for articles, 句 *ju* 'sentence' for sentences, 辆 *liang* 'cart, carriage' for vehicles, 艘 *sou* 'boat' for boats and ships, 棵 *ke* 'plant' for plants, 朵 *duo* 'flower' for flowers, 匹 *pi* 'cloth' for cloth and horses, and 声 *sheng* 'sound' for sounds. For instance:

间 *jian* originally means 'space or time in between', and it also refers to rooms. Thus, it becomes the specific classifier for all kinds of rooms: classrooms, bedrooms, kitchens, bathrooms, etc.

匹 *pi* used to refer to cloth of four 丈 *Zhang* length in ancient times (Li 1965, p. 473). In Modern Chinese, it is used as specific classifier for cloth in bolts. It is also a specific classifier of horses because the shadow of a horse is about the length of 匹 *pi* (*Kang-xi Zi-dian* 康熙字典 'the Dictionary of Characters in Kangxi', p. 94). Figure 7.10 shows the classification of 匹 *pi*.

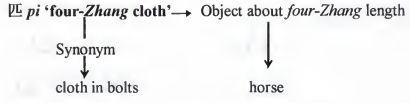

Figure 7.10 Classification network of *Pi*

(9) Time

A few Chinese classifiers describe the time or period of an event, such as 顿 *dun* 'pause', 期 *qi* 'period, phase', and 阵 *zhen* 'a period of time'. For example:

阵 *zhen* 'a period of time' is usually used after the number 一 *yi* 'one' to describe certain weather phenomena (e.g. rain, wind, snow, hail) which last for some time: 一阵风 *yi zhen feng* [one period wind] 'a gust of wind', 一阵雨 *yi zhen yu* [one period rain] 'a

spatter of rain'. It also classifies gun-fires and bombs which fall like rains: 一阵炮火 *yi zhen pao-huo* [one period cannon-fire] 'a burst of gun-fire'

(10) Type

Some classifiers in Chinese are the names of kinds, types and categories of objects or concepts. These include 番 *fan* 'kind; time', 回 *hui* 'return, circle', 家 *jia* 'family', 类 *lei* 'class, type', 门 *men* 'door; class, field', 项 *xiang* 'item', 样 *yang* 'shape, form, style', 种 *zhong* 'kind, type, class'. For example:

回 *hui* 'return; circle' is a classifier for verbs with the meaning of 'time'(see next section) and a classifier for matters to mean 'kind, type': 两回事 *liang hui shi* [two HUI matter] 'two (different) matters'.

门 *men* 'door → class, field, category' classifies knowledge, science, courses (in school) and fields of study which can be divided into different categories. For instance, 一门知识 *yi men zhi-shi* [one field knowledge] 'a field of knowledge', 两门学科 *liang men xue-ke* [two field study-category] 'two fields of study', 三门课 *san men ke* [three field course] 'three courses'. Moreover, 门 *men* also means 'piece' and is the specific classifier for cannon and artillery. The reason for this is unclear. In biological taxonomy, 门 *men* means 'phylum'.

(11) Others

There are also classifiers which are commonly used in Chinese but are more abstract and do not belong to the categories discussed above. They are 部 *bu*, 个 *ge*, 件 *jian*, 枚 *mei*, etc.

部 *bu* 'part; unit' classifies large machines, vehicles (automobiles and bicycles), major creative academic works and literary or art products (e.g.: novel, movie, dictionary,

sculpture). When it classifies large machines, it can be replaced by 台 *tai* (see 台 *tai* in Location); when it classifies vehicles, it can be replaced by 辆 *liang* (see 辆 *liang* in Synonyms).

个 *ge* 'individual' is the classifier most commonly used in Chinese. It classifies all the address terms for people, people-like objects and objects or countable abstract nouns which do not have their own specific classifiers. It can be regarded as a substitutive classifier in Chinese to replace the functions of many other classifiers in colloquial and casual situations.

件 *jian* 'piece; thing' classifies clothes and things like work, legal cases, and general objects which are not otherwise specifiable. E.g.: 一件衣服 *yi jian yi-fu* [one piece clothes] 'one clothes', 两件东西 *liang jian dong-xi* [two piece object] 'two things (objects)', 一件事情 *yi jian shi-qing* [one thing matter] 'an event, happening', 三件案子 *san jian an-zi* [three piece case] 'three cases'.

枚 *mei* originally means 'stick (of trees)' (Li 1965, p. 871). In Modern Chinese, it is a classifier with a classical flavor. The objects it classifies are postage stamp, ancient coins, badges and medals.

To summarize, our discussion of the noun classifiers has made the following assumption: even though the categories many classifiers apply to are highly complex, the analysis above shows that each of them can be derived from a basic cognitive value and can be explained by existing cognitive theories. Our cognitive analysis can describe the functions of those seemingly complex classifiers in a reasonable manner. By doing so, we have successfully found the collocational principles between classifiers and nouns, which would otherwise seem to be arbitrary.

7.1.3 Classifiers for Verbs

There are a number of classifiers for verbs to record the occurrence of an action. The common ones are 遍 *bian*, 次 *ci*, 回 *hui*, 下 *xia*, 趟 *tang*, 声 *sheng*, 顿 *dun*, 番 *fan*, 阵 *zhen*. Among them, 下 *xia*, 番 *fan*, and 阵 *zhen* can also quantify states (i.e. to be used with state verbs). The verb-classifiers do not show complex networks as noun-classifiers do, but they are similarly related directly to the semantic meanings of those words. In Chinese, the quantifier of an action or state must be in post-verb position.

遍 *bian* 'all over' is the classifier of completed actions. 次 *ci* 'order, sequence' is the general measure word for actions. The difference between these two words is that 遍 *bian* indicates the whole process of an action but 次 *ci* only indicates the occurrence without specifying whether the action has been brought to a completion not. For example:

(1) 那本书, 我看了两遍. *na ben shu, wo kan le liang bian*
[that book, I read LE two time]
'I have (completely) read that book twice.'

那本书, 我看了两次, 没看 完.
na ben shu, wo kan le liang ci, dou mei kan wan.
[that book, I read LE two time, not read finish]
'I tried to read that book two times, but I did not finish it.'

The first sentence in (1) cannot be followed by 没看 完 'did not finish reading it' as the second sentence.

回 *hui* 'circle; return' is the classifier for both nouns (see Type in above section) and verbs. When it is used as the measure for an action, the style is casual and more dialectal. It is interchangeable with 次 *ci* in most cases, but it usually does not classify uncompleted actions, since its semantic meaning 'circle' indicates a completed event.

下 *xia* 'down' is also a general classifier for verbs like 次 *ci*, but it is more casual than 次 *ci*. It indicates that an action or state has lasted for just a short time. For instance:

(2) 我吃了两下. *wo chi le liang xia*
[I eat LE two time] 'I tasted (it) twice.'

等一下. *den yi xia* [wait one time] 'wait a second.'

天气冷了一下. *tian-qi leng le yi xia* [sky-air cold one time]
'The weather was cold for a short while.'

趟 *tang* means 'wade'. As a classifier, it quantifies actions related to walking (e.g. walk, run, go, come). The action is a completed trip, e.g.

(3) 这条路, 我走/跑了三趟。 *zhe tiao lu, wo zou/pao le san tang.*
This road, I walk/run LE three time
'I walked/ran three times along this road.'

我去/来了两趟北京。 *wo qu/lai le liang tang beijing.*
I go/come LE two time Beijing
'I went/came to Beijing twice.'

声 *sheng* 'sound' is the specific classifier for actions related to voice or sound. The verbs it can quantify are 喊 *han* 'yell; shout; call', 叫 *jiao* 'cry; shout; call', 哭 *ku* 'cry', 骂 *ma* 'scold', 说 *shuo* 'speak; say', 响 *xiang* 'to make a sound'. It is also the classifier for nouns related to such actions (see Synonym in the section above).

顿 *dun* 'pause' is a pejorative measure word for actions like beat, hit, scold, complain, satirize, etc. It also indicates that the action it modifies lasts for some time. For instance, 打他一顿 *da ta yi dun* [beat him a time] 'give him a beating'.

番 *fan* 'time' is also a measure word for actions and states which last for some time or moment, but differs from 顿 *dun* in that it does not have a pejorative meaning.

For example, 抱怨了一番 *bao-yuan le yi fan* [carry-complain LE one time] 'complained for a while', 笑了一番 *xiao le yi fan* [laugh LE one time] 'laughed for a while'.

阵 *zhen* 'a period of time' quantifies actions and states which last for a period of time. For example, 风刮了一阵 *feng gua le yi zhen* [wind blow LE one moment] 'the wind blew for a while', 头疼了一阵 *tou teng le yi zhen* [head pain LE one moment] 'had a headache for some time'. The time indicated by 阵 *zhen* is usually a little longer than the time indicated by 番 *fan*, and the style is less causal.

7.1.4 Quasi-Measure Word

A few words which indicate time in Chinese are nouns and measure words at the same time, and when they are modified by a numeral, no other measure words are needed. Such words are termed as "quasi-measure words" (Chao 1968, p. 584). They are 年 *nian* 'year', 日 *ri* 'day', 岁 *sui* 'year; year of age', 天 *tian* 'day', 夜 *ye* 'night', and 周 *zhou* 'week'. 日 *ri* is the formal and classical version of 天 *tian*.

7.1.5 "Temporary" Measure Word

Many Chinese nouns, either monosyllabic or disyllabic, can also be "borrowed" to act as measure words. They are therefore called "temporary" measure words. They usually quantify nouns by container, location, or time. For verbs, "temporary" measure words usually indicate the instrument of an action. The following are some examples.

Container

三车人 *san che ren* [three vehicle people] 'three cars/buses-loads of people'

一脑袋主意 *yi nao-dai zhu-yi* [one brain-bag idea] 'a head full of ideas'

两桌子饭菜 *liang zhuo-zi fan-cai* [two table rice-dish] 'two tables of food'

Location

一村人 *yi cun ren* [one village person] 'people of the whole village'

两国人民 *liang guo ren-min* [two country person-people] 'people of the two countries'

一山树木 *yi shan shu-mu* [one hill tree-wood] 'a hill/mountain full of tree/woods'

Time

三学期课程 *san xue-qi ke-cheng* [three study-period course] 'courses for three terms'

两小时路程 *liang xiao-shi lu-cheng* [two small-time way-distance] 'the distance of two hours'

一星期假 *yi xing-qi jia* [one star-period vacation] 'a one-week vacation'

Instrument

砍两刀 *kan liang dao* [cut two knife] 'cut two times with a knife'

打三枪 *da san qiang* [shoot three gun] 'shoot thrice with a gun'

射一箭 *she yi jian* [shoot one arrow] 'shoot once with bow and arrow'

When "temporary" measure words quantify nouns, a phrase particle 的 *de* can be inserted after them: 三车 的人 *san che de ren* 'three cars/buses-loads of people', 一村的人 *yi cun de ren* 'people of the whole village', 三学期的课程 *san xue-qi de ke-cheng* 'courses for three terms'. At this time, such "temporary" measure words are more like nouns or something between nouns and measure words.

7.1.6 Summary

The discussion above shows the different types of Chinese measure words. Among them, the classifiers for nouns are most numerous and complex. They are central

to this study and are analyzed via cognitive theories. The classifying functions of Chinese classifiers are derived from a central cognitive property of the classifier and are structured as a network. The analysis describes the complex functions of many classifiers in a clear way, and it can be used in the pedagogy of Chinese vocabulary to help L2 learners acquire Chinese classifiers more effectively.

7.2 Localizers

Chinese localizers (or place words/suffixes) are words and suffixes added after nouns to express relative locations. The suffix forms are all mono-syllabic morphemes which refer to locations: 旁/边 *pang/bian* 'side; beside', 上 *shang* 'up; above; on', 下 *xia* 'below; under; down', 前 *qian* 'front', 后 *hou* 'back', 里 *li* 'inside', 外 *wai* 'outside', 中 *zhong* 'middle; center', 左 *zuo* 'left', 右 *you* 'right', 东 *dong* 'east', 南 *nan* 'south', 西 *xi* 'west', 北 *bei* 'north'. Most of them may take another suffix, such as 面 *mian* 'face', 头 *tou* 'head; top', 边 *bian* 'side', or 方 *fang* 'direction' to form disyllabic place-words, e.g. 旁边 *pang-bian* /边上 *bian-shang* 'side; beside'; 上面 *shang-mian* / 上头 *shang-tou* / 上边 *shang-bian* 'above; top'; 东面 *dong-mian* /东边 *dong-bian* /东方 *dong-fang* 'east'. A few localizers are independent words in their own right: 这儿 *zher* /这里 *zhe-li* /这边 *zhe-bian* [this-side] 'here; this place', 那儿 *nar* /那里 *na-li* /那边 *na-bian* [that-side] 'there; that place', 底下 di-xia [bottom-down] 'bottom; under', 方面 *fang-mian* [squire-side] 'aspect; area; side; field'.

When a Chinese common noun follows a locative preposition (or co-verb), such as 在 *zai* 'at' (it usually can be dropped, especially when it is in the sentence-initial position),

到 *dao* 'to', 从 *cong* 'from', 往 *wang* 'toward', a localizer (either a suffix or a word) must be added after the noun if the noun is not the proper name of a place. For instance:

(1) a. 球在椅子 那 儿 *qiu zai yi-zi nar*.
[ball at chair there] 'The ball is at the chair there.'

b. 他住到山 上 去了 *ta zhu dao shan-shang qu le*.
[he live to mountain-on go LE] 'He has moved to live in the mountain.'

c. 风从 湖 上 吹 来 *feng cong hu-shang chui-lai*.
[wind from lake-above blow-come] 'A wind is blowing from the lake.'

Except for the commonly used suffixes 上 *shang*, 下 *xia*, 里 *li*, and 中 *zhong*, the other Chinese localizers are not complex. The locations they indicate are just the meanings they contain. Thus, they will not be treated in this study. However, the selection between 上 *shang*, 下 *xia*, 里 *li* and 中 *zhong* is not completely dependent on the inherent meaning of each individual localizer translatable into English, e.g.: 'on; above' (上 *shang*), 'below; under' (下 *xia*), 'in; inside' (里 *li*) and 'middle' (中 *zhong*). In other words, their Chinese cognitive senses are not equal to their English translations. To make matters worse, in some cases, two or three of them are interchangeable, though in most cases, only one is appropriate in a given context. For example:

a. 树上有只鸟儿 *shu-shang you zhi niaor*
[tree-above have MW(measure-word) bird]
'There is a bird in the tree.'

b. 月亮挂在天上 /空中 *yue-liang gua zai tian-shang / kong-zhong*
[moon hang at sky-on / space-middle] 'The moon is hanging in the sky.'

c. 在这种情况下, 要安静 *zai zhe zhong qing-kuang-xia, yao an-jing*.
[at this kind situation-under, should quiet]
'One should be quiet in this situation.'

d. 班上/里有二十个学生 *ban-shang/li you er-shi ge xue-sheng*.
[class-on/in have twenty MW student] 'There are twenty students in the class.'

e. 我回到家中/里 *wo hui dao jia-zhong/li.*
[I return to home-middle/in] 'I went back home.'

f. 书上/里/中有一张画 *shu-shang/li/zhong you yi zhang hua.*
[book-on/in/middle have one MW picture] 'There is a picture in the book.'

g. 他手上/里/中有些钱 *ta shou-shang/li/zhong you xie qian.*
[he hand-on/in/middle have some money]'He has some money in his hand.'

Just as in all cases where more than one form is acceptable, examples (d)-(g) are puzzling and interesting at the same time. Are the different forms just in free variation? Or does each of them differ from the rest in usage? If so, how and why? Chao (1968, Section 7.10) gives their meanings but does not explain how they are distinguished. Xing (1996) discusses the use of 里 *li* and 中 *zhong* and claims: 里 *li* is only attached to an NP that tends to be a spatial position while 中 *zhong* is not only attached to an NP, but also can be the suffix of a VP or AP to indicate a location, and the NP attached by 中 *zhong* tends to be a collective or abstract one. However, his explanation does not seem to apply to the use of 里 *li* and 中 *zhong* in examples (2) above. In fact, the differences between these localizers are not in their function but reside in the perception of the speaker. In the following, I will try to analyze the localizers in terms of what is known as the cognitive domain. The analysis follows the theory of Langacker (1987, p. 148) where cognitive concepts at one level are presupposed by those at the next higher level. Furthermore, semantic units are assumed to be organized in the same hierarchical structure.

7.2.1 上 Shang

The lexical meaning of 上 *shang* is '*up*'. When it is used as a localizer, it indicates that the position of a trajector is stated as relative to a referent (the referent is generally

called a landmark) below/under it. The trajector and the landmark may or may not come into contact with each other. From this meaning, three functions of localizer 上 *shang* are derived.

A. Surface domain The surface of a landmark is used as a relative referent, and the surface may face to different directions and appear in various shapes. When a trajector and the landmark are attached, 上 *shang* is interpreted in the sense of the English 'on'; when they are not contacted, its meaning is similar to that of English 'above' or 'over'. For example:

(3). Attached to a landmark

a. 书在桌子上 *shu zai zhuo-zi-shang*.
[book at table-SHANG] 'The book is on the table.'

b. 墙上有张画 *qiang-shang you zhang hua*.
[wall-SHANG have MW picture] 'There is a picture on the wall.'

c. 房顶上挂了盏灯 *fang-ding-shang gua le zhan deng*.
[ceiling-SHANG hang LE MW light] 'A light is hanging on the ceiling.'

d. 门上挂着灯笼 *men-shang gua zhe deng-long*.
[gate-SHANG hang ZHE lantern] 'A lantern is hanging on the gate.'

e. 一只鸟站在树上 *yi zhi niao zhan zai shu-shang*
[one MW bird stand at tree-SHANG]
'A bird is perching on/in the tree (either on the trunk or on a branch) .'

f. 他站在山顶上 *ta zhan zai shan-ding-shang*.
[he stand at hill-top-SHANG] 'He is standing on the top of the hill.'

(4). Detached from a landmark

a. 飞机 从我们头顶上飞过 *fei-ji cong wo-men tou-ding-shang fei-guo*.
[airplane from our head-top-SHANG fly-pass]
'An airplane flew over our head.'

b. 河上有一座桥 *he-shang you yi zuo qiao*.
[river-SHANG have one MW bridge] 'There is a bridge over the river.'

c. 一只鸟在树顶上盘旋 *yi zhi niao zai shu-ding-shang pan-xuan*.

[one MW bird at tree-top-SHANG hover] 'A bird is hovering over the tree.'

Some objects regarded as containers in English are just viewed as planes in Chinese, and 上 *shang* is the locative suffix of these landmarks. For example:

(5) a. 报纸上有什么新闻 *bao-zhi-shang you shen-me xin-wen*?
[newspaper-SHANG have what news]
'Any news in the paper?'

b. 他坐在沙发上 *ta zuo zai shafa-shang*.
[he sit at sofa-SHANG] 'He is sitting in the sofa.'

c. 天上有很多星星 *tian-shang you hen duo xing-xing*.
[sky-SHANG have very many star] 'There are a lot of stars in the sky.'

d. 他在车上 *ta zai che-shang*.
[he at car-SHANG] 'He is in the car.'

B. Top domain A standing object is viewed as a landmark formed by both top and base portions, and 上 *shang* indicates that a trajector is at the top part of the landmark. In this case, the top part is highlighted as opposed to the base portion, and the position that 上 *shang* indicates is to be understood as relative to the base but not relative to the whole landmark.

(6) a. 他住在楼上 *ta zhu zai lou-shang*.
[he live at building-SHANG] 'He lives upstairs (not in the basement or ground floor).'

b. 高楼上闪着霓虹灯 *gao-lou-shang shan zhe nihong-deng*
[high-building-SHANG glitter ZHE neon-lamp]
'Neon lamps are glittering on the high buildings.' (The lights are either on the wall or on the top of the building but are not on the base of the wall.)

c. 树上有只鸟儿 *shu-shang you zhi niaor*.
[tree-SHANG have MW bird] 'There is a bird in the tree (in the crown).'

In these examples, the upper portion is treated as if it were an attachment to the lower portion, which is more easily accessible by the observer than the top part.

C. Metaphorical domain. Metaphor is an important facet in the function of human languages. It helps people describe or understand an abstract concept by way of a figure they are familiar with. For example, science, society and life can be metaphorically regarded as different geographical areas or surfaces. Thus, in Chinese when those terms are used as locations, they require either a following place word 方面 *fang-mian* [square-side] 'aspect; side; field; area' or the localizer 上 *shang* as their suffix. E.g.: 在科学方面/上 *zai ke-xue shang/fang-mian* [at science area/SHANG] 'in science', 在社会上/方面 *zai she-hui shang/fang-mian* [at society SHANG/area] 'in society', 在生活上/方面 *zai sheng-huo shang/fang-mian* [a live SHANG/area] 'in life'. All concepts related to those areas, such as history, math, study, economy, culture, teaching, eating, and so on, are regarded as their sub-categories or sub-areas. Therefore, when these nouns are used as locations, 上 *shang* is the localizer. This function is an extension of the prototypical value of 上 *shang*.

(7) a. 中国在经济上发展很快 *zhong-guo zai jing-ji-shang fa-zhan hen kuai*.
[China at economy-SHANG develop very fast]
'China is developed fast in (the area of) economy.'

b. 这个方法在教学上很成功 *zhe ge fang-fa zai jiao-xue-shang hen cheng-gong*.
[this MW method at teaching-SHANG very success]
'This method is very successful in teaching.'

c. 他感觉上不错 *ta gan-jue-shang bu cuo*.
[he feeling-SHANG not bad] 'He is pretty well in feeling (he feels well).'

d. 他在吃上很讲究 *ta zai chi-shang hen jiang-jiu*
[he at eat-SHANG very fastidious] 'He is fastidious about food.'

The relationships between the different domains of 上 *shang* are graphically represented in Figure 7.11. A vertical line represents the basic function/meaning, a thick arrow ⟶ represents a direct domain of the basic function/meaning, a thin arrow ⟶ marks an extended domain of the basic function/meaning or of an upper-level domain. The meaning of each domain is explained under it. The symbolic meanings are the same in other figures in this section. What figure 7.11 describes are: the basic function of 上 *shang* is to indicate a position related to a referent underneath or below an object; two domains, the surface domain and the top domain, are directly derived from the basic meaning, and the metaphorical domain is extended from the surface domain.

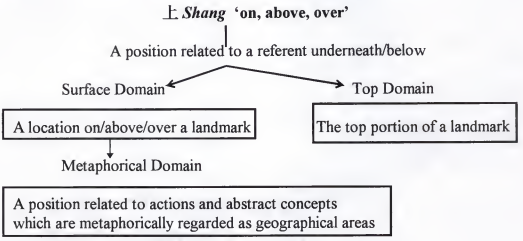

Figure 7.11 Domains of localizer *Shang*

7.2.2 下 Xia

下 *xia* means 'down; below; under' in Chinese. As a localizer, it is the antonym of 上 *shang* and prototypically indicates that the position of an object is below or under a referent, whether attached to it or not. It also has three functions which are derived from the basic cognitive meaning.

A. Surface Domain The surface of a landmark is viewed as the relative referent, and the position of an object is under/below the surface. For instance,

(8) a. 水下有鱼 *shui-xia you yu*.
[water-XIA have fish] 'There are fish under (in) the water.'
(The fish are under the water face)

b. 鞋子在床下 *xie-zi zai chuang-xia*.
[shoe at bed-XIA] 'The shoes are under the bed.'

c. 那只狗趴在树下 *na zhi gou pa zai shu-xia*.
[that MW dog lie at tree-XIA] 'That dog is lying under the tree.'
(Where the dog lying is under the crown of the tree)

d. 那张纸踩在他脚下 *na zhang zhi cai zai ta jiao-xia*.
[that MW paper step-on at he foot-XIA]
'That paper is (stepped-on) under his foot.'

e. 他站在灯光下 *ta zhan zai deng-guang-xia*.
[he stand at lamp-light-XIA] 'He is standing under the light of the lamp.'

B. Bottom Domain As with the localizer 上 *shang*, when a landmark is a standing object, it may be viewed to consist of top and bottom portions. 下 *xia* indicates that a location is at the bottom of the landmark or is in an area nearby the bottom part. It is the opposite of what is indicated by 上 *shang*,. The stated position is relative to the top portion, which is regarded as the major part of a landmark, but not relative to the whole landmark. For instance,

(9) a. 卧室在楼下 *wo-shi zai lou-xia*.
[lie-room at building-XIA] 'The bedroom is on the ground floor of the building (downstairs).'

b. 那只狗趴在他脚下 *na zhi gou pa zai ta jiao-xia*.
[that dog lie at he foot-XIA] 'That dog is lying at his feet.'

c. 村子在山下 *cun-zi zai shan-xia*.
[village at mountain-XIA] 'The village is at the foot of the mountain.'

d. 我在车下跟他说话 *wo zai che-xia gen ta shuo-hua.*
[I at bus-XIA and he speak-speech]
'I am talking to him outside the bus/truck.'

C. Metaphoric Domain 下 *xia* also has a metaphoric domain with abstract nouns like atmosphere, air, circumstances, situation, case, condition, and state are used as locations. The concepts expressed by those nouns are often perceived as being able to permeate all the space that encompasses the world. In the mind of an English speaker, most of the world operates 'in' the all encompassing space. But in the mind of a Chinese speaker, such locations are above the world and everything else is under or below them. Thus, 下 *xia* is the localizer for light, air and all the abstract concepts mentioned above.

(10) a. 在这种情形下, 大家都无拘无束
zai zhe zhong qing-xing-xia, da-jia dou wu-ju-wu-shu.
[at this kind situation-XIA, all-people all no-restrain-no-bind]
'Under this circumstance, no one feels any restraint.'

b. 在宽松的气氛下, 人民才有言论自由 *zai kuan-song de qi-fen-xia, ren-min cai you yan-lun zi-you.* [at wide-loose DE air-air-XIA, people only (then) have speech-speech freedom] 'Only under the relaxed atmosphere can people have freedom of speech.'

c. 动物在冬眠的状态下不吃不喝 *dong-wu zai dong-mian de zhuang-tai-xia bu chi bu he.* [animal at winter-sleep DE shape-state-XIA not eat not drink]
'Animals do not eat and drink (when they are) in hibernation.'

Figure 7.12 in next page shows the different domains in which the localizer 下 *xia* operates.

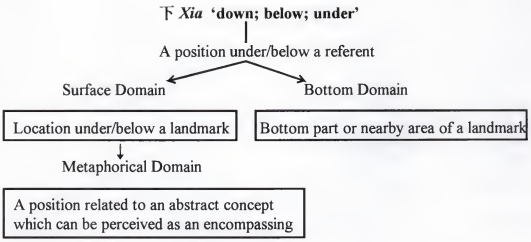

Figure 7.12 Domains of localizer *Xia*

7.2.3 里 Li

The lexical meaning of 里 *li* is 'inside'. It indicates that the position of a trajector is relative to what is outside of a landmark. The landmark thus is conceived as having a dividing line on its side(s), either be a border or a simple edge. From this cognitive meaning, 里 *li* is used in the following situations.

A. Container domain When a landmark is a container, 里 *li* states that the position is inside the landmark. This is the prototypical function of 里 *li*. E.g.:

(11) a. 杯子里有水 *bei-zi-li you shui.*
[cup-LI have water] 'There is water in the cup.'

b. 他从屋里出来 *ta cong wu-li chu-lai.*
[he from house-LI exit-come] 'He came out from the house.'

c. 泉水流进湖里 *quan-shui liu jin hu-li.*
[spring-water flow enter lake-LI] 'The spring (water) flows into the lake.'

B. Border Domain When a landmark is viewed as a border or an edge of a space, 里 *li* indicates that the location is inside it, either attached to or nearby the landmark. This function is extended from the basic cognitive meaning of 里 *li*.

(12) a. 他一脚在门里, 一脚在门外 *ta yi jiao zai men-li, yi jiao zai men-wai.*
[he one foot at door-LI, one foot at door-outside]
'One of his feet is in the door and the other foot is out the door.'
(A door is the border of a room or house.)

b. 一人在墙里, 一人在墙外 *yi ren zai qiang-li, yi ren zai qiang-wai.*
[one person at wall-LI, one person at wall-outside]
'One person is on this side of the wall, (and) another person is on the other side.'
(A wall is the border of a house, yard or place.)

c. 窗里亮着灯 *chuang-li liang zhe deng.*
[window-LI light ZHE lamp]
'A light is on inside the window.'
(The speaker is outside of a house or room, and the window is the edge/border of the house/room)

C. Areal domain When a landmark is a place or an area with borders or edges, 里 *li* is used as the localizer to indicate a position inside the place or area, which is relative to what is outside the place/area.

(13) a. 我住在城里 *wo zhu zai cheng-li.*
[I live at city-LI] 'I live in the city.'

b. 他从那个村里出来 *ta cong na ge cun-li chu-lai.*
[he from that MW village-LI out-come] 'He came out from that village.'

When an indicated position is not relative to what is outside a landmark, or when a noun refers to a land or field which is not conceived as surrounded by a physical border, only 上 *shang* can be the localizer since the landmark is just a surface, e.g.

c. 我们生活 在这美丽的土地上/*里 *wo-men sheng-huo zai zhe mei-li de tu-di-shang/*li.* [I-plural bear-live at this beautiful DE soil-land-SHANG/*LI]
'We are living on this beautiful land.'

d. 他在球场上/*里 打球 *ta zai qiu-chang-shang/*li da qiu.*
[he at ball-ground-SHANG/*LI play ball]
'He is playing the ball on the ball-ground.'
(The border is not cognitively significant.)

Similarly, when a wide plain without barriers (like mountains) around it to block our view or without an obvious edge, 里 *li* cannot be suffixed to indicate any location on it.

e. 这个县在平原上/*里 *zhe ge xian zai ping-yuan-shang/*li*.
[this MW county at plain-SHANG/*LI]
'This county is on the plain.'

Both 上 *shang* and 里 *li* can be the localizer for the noun 山 *shan* 'mountain; hill', but they refer to different locations. When 上 *shang* is used, it just indicates a position on the surface of a specific mountain or hill; when 里 *li* is the localizer, it refers to a location in an area surrounded by mountains as a perceptual border. For example:

f. 他住在山上 *ta zhu zai shan-shang*.
[he live at mountain/hill-SHANG] 'He lives in the mountain/hill.'

g. 那个县在山里 *na ge xian zai shan-li*.
[that MW county at mountain-LI] 'That county is in a mountainous area.'

D. Metaphorical domain 里 *li* can be metaphorically extended to state a location inside a group of people, which are divided from others outside the group and are imaged as an area with perceptual borders or edges. The following are some examples.

(14) a. 人群里有人大笑 *ren-qun-li you ren da-xiao*.
[people-mass-LI have person laugh]
'Someone is /Some people are laughing in the crowd.'

b. 他是班里最高的学生 *ta shi ban-li zui gao de xue-sheng*.
[he be class-LI most high DE student] 'He is the tallest student in the class.'

As in other languages, time can be perceived as space, and a period of time can be perceived as a space or area with beginning and ending edges. As a result, 里 *li* can be suffixed to a time phrase to indicate an event located within a specific period of time. For instance:

c. 这 活 要 在一个星期里完成 *zhe huo yao zai yi ge xing-qi-li wan-cheng.*
[this work should at one MW week-LI finish]
'This work should be finished in a week.'

In another direction, a container can be viewed as where something is hidden. From the Container Domain, an extended function is derived, and 里 *li* is often used to locate an event happening without the knowledge of somebody (a specific person or specific persons, though unnamed). For example,

d. 他私下里攒了些钱 *ta si-xia-li zan le xie qian.*
[he privacy-LI save LE some money] 'He saved some money privately.'

e. 背地里我们叫他 "小气鬼" *bei-di-li wo-men jiao ta "xiao-qi gui".*
[back-place-LI we call he stingy ghost]
'We call him "stingy ghost" in his back place (behind his back).'

f. 他站在黑暗里 *ta zhan zai hei-an-li.*
[he stand at dark-LI] 'He is standing in the dark.'

The located domains and their relationships of 里 *li* are shown as Figure 7.13.

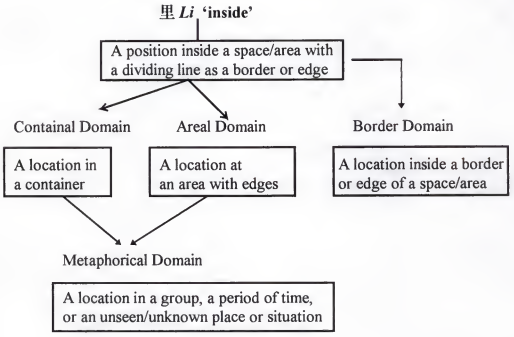

Figure 7.13 Domains of localizer *Li*

7.2.4 中 Zhong

The basic lexical meaning of 中 *zhong* is 'middle; central'. As a localizer, it means the same as the English 'in, among', indicating a position in a landmark. The position is only relative to the landmark itself. This is the value that distinguishes 中 *zhong* and 里 *li*. When 中 *zhong* is used, a landmark is conceived as without a dividing line on its side(s) as a border or edges. Based on its cognitive meaning, 中 *zhong* is used in the following situations.

A. Space Domain As a localizer, 中 *zhong* typically refers to a position in a three dimensional space. Since the location marked by 中 *zhong* is only relative to the space itself, the space is conceived as without a border/edges or its border/edges is/are ignored. For instance:

(15) a. 月儿挂在空中 *yuer gua zai kong-zhong*.
[moon hang at space-ZHONG] 'The moon is hanging in the sky.'

For the same reason, 中 *zhong* can not be attached to a noun which refers to the border of a container or space. With a border, only 里 *li* can be the appropriate localizer, e.g.:

b. 窗里/*中挂了窗帘 *chuang-li/*zhong gua le chuang-lian*.
[window-LI/*ZHONG hang LE window-curtain]
'A drape hangs inside the window.'

Some nouns may take either 中 *zhong* or 里 *li* as the localizer, but the indicated meanings may be different. When 中 *zhong* is used, the position of a trajector is only relative to the landmark; but when 里 *li* is the localizer, the position it refers to is relative to what is outside the landmark. For example:

c. 城中有个公园 *cheng-zhong you ge gong-yuan.*
[city-ZHONG have MW park] 'There is a park in the central area of the city.'

d 城里有个公园 *cheng-li you ge gong-yuan.*
[city-LI have MW park] 'There is a park in the city.'

B. Areal Domain 中 *zhong* can also refer to a position in a place or area, just as 里 *li* does. In most cases under this domain, the difference between 中 *zhong* and 里 *li* is not obvious, and the function of 中 *zhong* is neutralized. E.g.:

(16) a. 森林中/里有很多小动物 *sen-lin-zhong/li you hen duo xiao dong-wu.*
[forest-ZHONG/LI have many small animals]
'There are many small animals in the forest.'

b. 村中/里有一百多口人 *cun-zhong/li you yi-bai duo kou ren.*
[village-ZHONG/LI have one-hundred more MW people]
'There are more than one hundred people in the village.'

C. Group domain Just as with 里 *li*, 中 *zhong* can also be attached to a plural noun to treat a group as a landmark. This function is extended from its concrete usage.

(17) a. 他们中有人是学生 *ta-men-zhong you ren shi xue-sheng.*
[he-plural-ZHONG have person be student]
'There are some students among them.'

b. 三兄弟中/ 里选一个 *san xiong-di-zhong/li xuan yi ge.*
[three brother-brother-ZHONG/LI choose one MW]
'(We) choose one from the three bothers.'

D. Process domain 中 *zhong* can be further extended to view an action or state as a space/area and to indicate a position in a state or a proceeding action. In this function, the progress of an event or the state of being is highlighted, and the localizer is affixed to the state or action verb. For example:

(18) a. 调查中他发现不少问题 *diao-cha-zhong ta fa-xian bu shao wen-ti.*
[investigate-ZHONG he find not few problem]
'He found many problems in the investigation.'

b. 奔跑中他感到腿有点痛 *ben-pao-zhong ta gan-dao tui you dian tong.*
[run-ZHONG he feel leg have little pain]
'He felt a slight pain in his legs during the running.'

c. 他们在热恋中 *ta-men zai re-lian-zhong.*
[they at hot-love-ZHONG] 'They are deeply in love.'

d. 气愤中他撕了这封信 *qi-fen-zhong ta si le zhe feng xin.*
[angry-ZHONG he tear LE this MW letter]
'He tore the letter up in anger.'

e. 他在沉默中思考 *ta zai chen-mu-zhong si-kao.*
[he at silent-ZHONG think] 'He is thinking in deep silence.'

调查 *diao-cha* 'to investigate' in (a), 奔跑 *ben-pao* 'to run' in (b), 热恋 *re-lian* 'to love deeply' in (c), 气愤 *qi-fen* 'to be angry' in (d), 沉默 *chen-mu* 'to be in silence' in (e) are action or state verbs in their own right. But when they are affixed with the localizer 中 *zhong*, they function as location nouns.

As a summary, the functions of 中 *zhong* can be represented in the following schema:

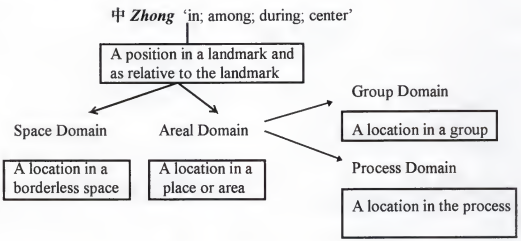

Figure 7.14 Domains of localizer *Zhong*

From the discussion of the localizers above, a conclusion can be reached: 上 *shang* indicates that a trajector is attached to or located above the surface of a landmark or that a trajector is on the top region of a landmark. 下 *xia*, in contrast with 上 *shang*, indicates that a trajector is below or under the surface of a landmark or that a trajector is at the bottom region of a landmark. 里 *li* indicates that a location is inside a landmark and it is relative to what is outside the landmark; thus, the landmark usually has a border or edges. 中 *zhong* marks a location in a landmark and the position is only relative to the landmark itself; thus, the landmark usually does not have visible edges or the edges are ignored in a speaker's mind. Moreover, 中 *zhong* is also attached to a verb to indicate a position in a state or in the middle of a proceeding action. All the various functions of those localizers are derived from their basic cognitive meanings and are formed as a functional network for each localizer. The analysis has been carried out from the perception of the cognitive theory briefly stated at the beginning of the chapter.

7.3 Conclusion

Chinese measure words and localizers usually cause problems to L2 learners of Chinese, because their usage is primarily both functional and communicative and there are no simple syntactic rules to guide the use of them. In this chapter, a cognitive analysis was used to find the meanings and functions of Chinese measure words (especially classifiers) and localizers. The results of this study offer some general principles of how and when to use a specific measure or localizer, and those principles will hopefully guide L2 learners to acquire the Chinese words/suffixes effectively. The results also illustrate that the use of classifiers and localizers are governed by their cognitive meanings, i.e. the

cognitive images of an object or concept in speakers' minds. Such images may vary with different cultures and give rise to a variety of expressions in different languages that cannot be explained by rigorous syntactic rules or by simple translation. Therefore, such meanings should be explained to L2 learners in cognitive terms for effective learning.

CHAPTER 8
PEDAGOGICAL APPLICATION OF CHINESE VOCABULARY

The goal of this study, as mentioned in Chapter One, is to propose an effective pedagogy which can help CFL/CSL learners lighten their memory load and improve their vocabulary acquisition. Based on findings stated in the previous chapters in conjunction with other related studies in SLA, psycholinguistics, Chinese morphology, and CFL/CSL, a systematic vocabulary pedagogy from the beginning to the advanced Chinese level is proposed in this chapter. It will identify what kind of words need to be introduced at a certain stage and discuss how to introduce them effectively.

8.1 Pedagogical Applications at the Beginning Chinese Level

The main task of Chinese vocabulary instruction at the beginning level is to teach common character-radicals and a certain amount of "core" vocabulary, i.e. the monosyllabic and disyllabic words that are most-frequently used in modern Chinese. This approach is based on the characteristics of Chinese vocabulary and the findings of this research.

8.1.1 Characteristics of Chinese Vocabulary and Characters

It goes with saying that in CFL/CSL, high-frequency vocabulary should be introduced at the beginning Chinese level. According to *Xian-dai Han-yu Pin-lu Ci-Dian* <<现代汉语频率词典>> (A Word-Frequency Dictionary of Modern Chinese)

(Wang 1986), monosyllabic words are distributed in the following way: 2,400 in the 9,000 common Chinese words, 957 in the 2,000 high-frequency words, and 565 in the 1,000 most-frequently used words. The statistics indicate that many monosyllabic words have a high-frequency use in modern Chinese. At the beginning Chinese level, the 1,000 most-frequently used words should be the "core" words in vocabulary instruction and textbook design. Moreover, the 565 monosyllabic words should be given more attention, because most of them serve as the basis for compound words. Since each monosyllabic word is written as one Chinese character, the characters representing these high-frequency words should form the basis of vocabulary acquisition at this stage. They must be made the focus of learning in reading and writing at the beginning level. According to *Han-yu Shui-Ping Ci-hui yu Han-zi Deng-ji Da-gang* <<汉语水平词汇与汉字等级大纲>> (Criteria for Chinese Vocabulary and Characters at Different Proficiency Levels) (1992), 1,033 basic words should be learned at the beginning level. All these words, about half of which are monosyllabic, contain 800 characters. This fact shows that, at the beginning level, vocabulary learning in fact is largely a process of character learning.

As mentioned in Chapter One, although the total number of Chinese characters is huge, only 2,500-3,000 of them are common ones that form thousands of words and comprise 99.9% of Chinese reading materials. Therefore, only those 2,500-3,000 characters need be learned by L2 learners of Chinese. Nevertheless, this is still a difficult task for the learners if they memorize each character individually. Fortunately, Chinese characters have another feature: each of them is a unit formed by one or more radicals and components. The number of common and basic radicals is only between 70-100, and from them more than 70% of all characters can be derived (Huang 1996, Fei 1996). Obviously,

if these 70-100 radicals/components are learned first, a large number of characters can be acquired more easily, since most of them are built on those common components. Furthermore, character radicals may also help learners remember or infer the meaning and pronunciation of a character more easily. Even though the writing system of Chinese is said to be "ideographic", pure ideographic and pictographic characters in Chinese account for less than 20% of the total. About 80%-90% of characters (depending on the total number of calculated characters) are morphemic-phonetic in nature (Zhang 1992, Wu 1993, Gong 1994). In these characters, the semantic radical (simply referred to as 'radical' in tradition) provides a cue to the meaning category (i.e. plant, animal, bird, action with hand, liquid, etc.) of the whole character; and the other component, the phonetic one, indicates the pronunciation. For example, in the character 铜 *tong* 'copper', the radical 钅 ('metal') indicates that the character means a metal, and the whole unit is read by the pronunciation of component '同 *tong*' on the right, which is also a character itself. Semantic radicals tend to be located at the top or on the left side of characters, and phonetic components tend to occupy the right or bottom position. Because of the phonological evolution of the language, only about 50% of the phonetic components closely mark the pronunciation of the character in Modern Chinese (Gong 1994). Thus, the phonetic components may not be very helpful in inferring the pronunciation. However, they are still very useful in memorizing the characters, because they themselves are individual characters (either single or compound) and can be treated as smaller units in character storage in the mental lexicon. Results of psycholinguistic studies have found that radicals/components are the main source of information for character recognition and are very helpful tools for memorizing and inferring the meanings

of characters (see Section 8.1.2). Because of the unique characteristics of the Chinese characters and words, common radicals/components should form an important foundation for Chinese vocabulary acquisition and must be introduced and learned at the beginning Chinese level.

8.1.2 Studies in Character Recognition and Learning

Up until now, there have not been many pedagogical studies on how to teach Chinese characters. In most Chinese textbooks for L2 learners, characters are just listed in the lexical items, and no specific introduction is made to teach the characters. On the other hand, many psycholinguistic studies have found that character radicals or components are the basic psychological units in the recognition of Chinese characters by native speakers. Flores d'Arcais (1992) has found that there is a lexical decomposition process in the recognition of complex characters in adult readers. Also the various components (i.e. the phonetic and semantic components) in a lexical unit are interrelated in the recognition process to allow the reader to perform the pronunciation response and to know the meaning of the character. Li and Chen (1997) also indicates that the radical level (or sub-character level) of a character exists as a psychological entity. "At least in the early stages of processing, characters are probably perceived as radical components rather than as whole characters" (Li and Chen 1997, p.141). Radicals and their relations are suggested as the main information source for Chinese character recognition (Peng, Li and Yang 1997). Shu and Anderson (1997) found that Chinese children are aware of the relationship between a radical and the meaning of its character. Their experiment showed that, when the radicals are familiar and the conceptual difficulty of the words is low, children are able to use radicals to derive the meanings of new characters. Moreover, in

the investigation of Ke (1998), 80.95% of the Chinese-heritage learners (i.e. one or both of whose parents are Chinese) and 73.08% of the non-heritage learners felt that learning character components (semantic radical and phonetic components) is more effective than learning stroke order and writing characters repetitively. It was also found that those same students tended to have higher scores on a character production test. Cheng (1998) shows that teaching radicals at the beginning Chinese level could speed up all three stages of character learning: the Strokes and Outline Stage (i.e. learners only note strokes and the outline of a character), the Radicals and Parts Stage (i.e. learners begin to recognize some radicals and character parts), and the Whole-Character Stage (i.e. learners have the structure idea of a whole character). In Chapter Three and Chapter Four of this study, it has been shown that the native Chinese speakers usually used character radicals to help themselves infer meanings of unfamiliar words, but the L2 learners of Chinese did not have sufficient knowledge of character radicals and thus could not infer the meanings of unknown words as successfully as the native speakers did. All the findings provide immediate pedagogical implications for Chinese vocabulary learning and teaching: The radical and the component of a character are very important tools, and students must be taught the common radicals/components so that they can use this knowledge as a strategy to help them learn and memorize characters and words.

8.1.3 Pedagogical Methods of Vocabulary and Character Teaching

At the beginning level, L2 learners of Chinese are supposed to learn the pronunciation system, basic expressions and grammar, in addition to basic vocabulary and characters. Vocabulary is not the focus and cannot be allotted as much time as one might

wish to have. On the basis of all the studies and findings discussed above, the following steps are suggested to remedy the situation.

A. Introducing main radicals and components of Chinese characters. As soon as L2 learners begin to study simple Chinese sentences, they start to encounter Chinese words and must learn how to read and write them. It has been found that many L2 learners spend an unduly large portion of their time struggling to memorize complex characters if they are not introduced to the knowledge of radicals and character structures (Cheng 1998). Common mistakes of L2 learners in character writing are stroke order, character components and character structures. They do not know how to write a character as a unit and may miswrite character components if they are not trained properly. Therefore, stroke order, radicals and character structures should be introduced before or, at the latest, at the same time as L2 learners begin to learn complex characters.

Stroke order can be learned when learners practice radicals. There are about 70-100 common radicals with semantic meanings (see Appendix C). Those radicals are simple and have only a few strokes. Thus, they are easy to learn and can be memorized in a short time. Many radicals are also simple characters and monosyllabic words, such as 言 *yan* 'speech', 火 *huo* 'fire', 山 *shan* 'hill, mountain', 木 *mu* 'wood, tree'. While L2 learners study radicals, they are also learning some useful words. Most of the radicals are pictographic or ideographic symbols. For instance, 氵 is a pictograph of three drops of water, so it means 'water'. If such related knowledge of how characters were created is also introduced in a simple and general manner, not only will it make radical learning more interesting, but it will also help L2 learners understand and remember their meanings. When a radical is introduced, characters containing the radical that L2 learners will come

into contact with in the near future can be used as examples. For example, when the radical 木 *mu* 'wood' is taught, 椅 *yi* 'chair', 桌 *zhuo* 'table, desk', 床 *chuang* 'bed' can be used to illustrate its different positions. The examples may serve to introduce the characters the students are going to learn. They in fact also illustrate different structure types of character composition in terms of the position of the radical. A knowledge of such types is helpful in preparing the students for character learning.[1] The types and their percentages are listed in the following (Yin and Rohsenow 1994, p. 91):

Table 8.1 Character-structure types and percentages

Structure Name	Percentage	Examples
Single	3%	日 月 口
Right-(Middle)-Left	65%	河 林 谢
Top-(Middle)-Bottom	23%	花 家 爱
Enclosing	9%	因 国 回 (all-round) 同 医 凶 (three-sides) 床 过 起 (two-sides)

B. Teaching complex characters by components. When L2 learners start to learn sentences and words, they will encounter complex characters formed by two or more radicals and other components. Learners can be taught to use their radical knowledge to

Note: 1. If the learners' first language is Japanese, Korean or some of the other Asian languages, which may also use some Chinese characters in the writing system, the knowledge of character radicals can be introduced very quickly, and character strokes and structure types do not need to be taught. Nevertheless, the characters which have different meanings or are not written completely the same in Chinese as in their L1s must be attended to in teaching.

learn characters, i.e. to decompose a character into radicals or components they already know, and then try to remember by the components. For instance, 椅 *yi* 'chair' can be decomposed as 木 *mu* 'wood', which refers to the material, and 奇 *qi* 'strange', which marks the syllable final of the pronunciation; or to be 木 *mu* 'wood', 大 *da* 'big' and 可 *ke* 'able'. For memorizing characters, a learner can just try to recall the locations of the radicals and the other parts. This will be much easier and more effective than memorizing stroke by stroke. While the meaning of a radical helps distinguish similar characters from each other, a phonetic component can group different characters for easy review. For example, characters 情 *qing* 'feeling', 清 *qing* 'clear', 请 *qing* 'please; invite', 睛 *jing* 'eyeball' all contain the same component 青 *qing*, which marks their syllabic pronunciations. They can be listed together to help learners systematically remember them and to distinguish between them by the radicals on the left which indicate their meanings: 忄 'heart', 氵 'water', 讠 'speech', and 目 'eye'.

C. Teaching pronunciation of characters in meaningful sentences. Unlike alphabetic words, many Chinese characters do not have their pronunciations marked directly. As mentioned above, even though most characters in modern Chinese are morphemic-phonetic, the phonetic component does not often represent the accurate pronunciation because of the historical evolution of the Chinese phonological system. In modern Chinese, about 50% of the phonetic components mark the syllables of their characters quite accurately (Gong 1994), but the other 50% may just mark the final of the syllable or may have completely lost their phonetic function. Moreover, many frequently-used characters learned at the beginning level are not morphemic-phonetic characters. Sometimes, a single character may even have different pronunciations for different

meanings, for example, 重 for *zhong* 'heavy'; or *chong* 'repetitive'. Therefore, at the beginning level, phonetic components can only be used to help learners recall the pronunciations and the composition of the morphemic-phonetic characters; they cannot be relied on as the only source for accurate pronunciation. The traditional way of learning pronunciation is still needed: to include new characters or words in meaningful sentences. While L2 learners learn to speak the sentences, they are also learning the pronunciations of the words and the characters.

Besides monosyllabic words, L2 learners at the beginning level will inevitably encounter words with affixes, particles, compounds containing two or more characters, and measure words (classifiers). In those cases, additional learning strategies are needed.

D. Introducing meanings of lexical affixes and morphemes in compounds. As mentioned above, at the beginning level, L2 learners have other important tasks in learning the language than just studying word types and structures. Many words they learn at this level are monosyllabic words. However, it does not mean that they will not study any other kinds such as compounds and Root-Affix words. When disyllabic and polysyllabic words are encountered, it is better to introduce the meanings of their word components as a learning strategy. This will help learners 1) learn the meaning of each character they encounter, 2) understand how the meaning of a disyllabic/polysyllabic word is derived, and 3) have the primary impression of what the structure of Chinese words is like. Compounds containing the same component can be grouped together for memorization (e.g.: 办 *ban* 'do' in 办法 *ban-fa* [do-way] 'method' and 办公室 *ban-gong-shi* [do-business-room] 'office'). There are also other effective ways of memorizing

both monomorphemic words and compounds, e.g. linking words as networks according to their semantic categories ('action', 'location', 'furniture', 'food', etc).

E. Introducing cognitive meanings of Chinese measure words (classifiers) and localizers. As mentioned in Chapter Seven, except for a few semi-measure nouns, a proper measure word is always needed in Chinese when a noun is modified by a numeral. At the beginning level, L2 learners will encounter some common measure words classifying nouns, such as 个 *ge*, 把 *ba*, 张 *zhang*, 只 *zhi*, 间 *jian*, etc. As discussed in Chapter Seven, the collocation between a noun and a measure word (classifier) is decided by the semantic classification and cognitive meaning of the noun. For example, 把 *ba* is for physical objects with a handle or arm (e.g. "knife", "umbrella", "tea pot", "chair"), 张 *zhang* is for physical objects with a flat surface to place things on (e.g. "bed", "paper", "table"). Such basic classifying features of nouns should be introduced to L2 learners in order to help them understand and know how to use a measure word, especially a classifier. Also, at the beginning level, learners will come across localizers like 上 *shang* 'above', 中 *zhong* 'middle, among', 下 *xia* 'down, below, under', 里 *li* 'inside'. Those localizers are usually attached to nouns to indicate locations. As shown in Chapter Seven, their associations with nouns, however, are based on their cognitive meanings in Chinese culture and are sometimes quite different from those in English. Their cognitive domains also must be unambiguously introduced to L2 learners in order to avoid mistakes caused by L1 interference.

8.2 Pedagogical Applications at the Intermediate Chinese Level

When L2 learners of Chinese are at the intermediate level, they have acquired basic Chinese grammar, a certain number of characters and words, and have begun to learn longer texts (including reading, writing and speaking). At this time, in order to read and write short articles and stories, they must enlarge their vocabulary quickly. In *Han-yu Shui-Ping Ci-hui yu Han-zi Deng-ji Da-gang* <<汉语水平词汇与汉字等级大纲>> (Criteria for Chinese Vocabulary and Characters at Different Proficiency Levels) (1992), 2,018 new lexical items are listed for students at the beginning-intermediate level, and 2,202 more new words are for students at the intermediate-advanced level. In total, 4,220 new words are supposed to have been learned by the end of the Intermediate level. Thus, learning a large number of words is one of the main tasks at this learning period. In order to help L2 learners study words more effectively, the basic knowledge and rules of Chinese morphology and more strategies for understanding and memorizing new words should be introduced. All the pedagogical methods and learning strategies should be based on the properties of both SLA and Chinese vocabulary.

8.2.1 Morphology in Vocabulary Acquisition

In the study of vocabulary acquisition, vocabulary is traditionally separated into two groups: decoding vs. encoding, comprehension vs. production, or passive vs. active. This dichotomous split, however, ignores an intermediate stage. Summer (1988) argues that there should be a stage of deep understanding or detailed comprehension (i.e. to understand a word from its general meaning as a native does, not just for a meaning in a particular text). Henriksen (1999) also stresses that L2 learners must be allowed to be

vague about word meanings at first. "Precision will come later and lexical development can be characterized as a move or progression from rough categorization or vagueness to more precision and mastery of finer shades of meaning" (Henriksen 1999, p. 311). Obviously, the understanding of a word does not necessarily lead to its correct use. Before production, a learner must remember the word in its form and its pronunciation in addition to its meaning. Moreover, only a detailed comprehension can lead to the native-like use of a word. Thus, the total acquisition process of a word should be in the following five stages:

Comprehension → Storage in Memory → Interlanguage Production → Detailed Comprehension → Native-like Production.

Detailed comprehension needs rich language encounter and practice. It is impossible for intermediate-level students to both understand and produce all of the 4,220 Chinese words native-likely. Thus, vocabulary pedagogy at this level should pay more attention to the first three stages: comprehension, storage in memory, and some degree of production (i.e. production in some particular texts or in near native-like manner). In all of these stages, knowledge of morphology is very useful.

1. Knowledge of morphology can help learners understand the meanings of unfamiliar words and identify words in Chinese.

For students above the beginning level, word morphology has been suggested in many studies to be a useful technique for discovering word meanings. It has been found that lexical development can be characterized in terms of increasing morphological complexity, and the ability of finding the meanings of unknown words by morphological structure increase with age and grade (Anglin 1993). "Word structure analysis contributes

to the learning of word meanings, both in English and in Chinese" (Shu and Anderson 1995, p. 81). The results of the research discussed in Chapter Three of this study also show that native Chinese speakers usually use word structure to reach the meanings of unfamiliar words. However, L2 learners, as shown in Chapter Four, usually cannot successfully infer the meanings of unfamiliar words. One important reason is that they do not have the knowledge of Chinese word structure. Thus, morphological knowledge must be taught to L2 learners in order to help them discover the meanings of unfamiliar words.

Chinese word structure can also help L2 learners identify words. As mentioned before, Chinese word boundary is not overt. Whether a character is a word or not is judged by contextual information and morphological knowledge, i.e. whether or not the character is always used as a bound morpheme. If a learner knows what characters are usually used as affixes or cannot be used alone, s/he will be able to judge if a character is a word in reading.

2. Morphological knowledge can reduce memory burden and enhance vocabulary storage in memory.

Scholars believe that the acquisition of word formation rules "simplifies the task of gaining command of the target lexicon because it provides generalizations, which reduce the need for memorization and heavy reliance on context clues" (Olshtain 1987, p. 231). As discussed in Chapter Two, psycholinguistic studies have found that morphological structure is stored in the mental lexicon. Such knowledge helps language users build sets of patterns by regular rules. They therefore do not have to memorize lexical items one by one. Psychological studies also find that words are stored in memory as networks. If words can be grouped by categories, they will be remembered more easily. Morphological

knowledge can help learners rearrange words in a network by morpheme categories (i.e. to group words containing the same morpheme), and such a morpheme network can also make it easier to both memorize and distinguish similar words.

3. Morphology can correct production.

According to the Monitor Model of L2 Production (Krashen 1981), language knowledge and principles can guide language actions and monitor speech production before or after actual output. At the intermediate level, as discussed above, word production mostly is not native-like and happens in some particular texts. Such production may be incorrect or inaccurate. Morphological knowledge can help L2 learners improve their word production and change semi-production into whole-production or native-like production. First, as Wan (1989) has argued, the knowledge of morphemes can help L2 learners distinguish the usage of compounds with similar semantic meanings and avoid producing expressions with wrong words. For example, in Chinese, 参观 *can-guan* [join-watch], 访问 *fang-wen* [visit-ask], 游览 *you-lan* [travel-see] may all be translated as 'visit', used as a verb or a noun. If learners know the meanings of their individual morphemes, they will understand easily that 参观 *can-guan* means to visit a place and watch exhibit or activity, 访问 *fang-wen* means to (visit a place and) meet or talk with certain people, and 游览 *you-lan* is to visit a place for sightseeing. Second, knowledge of morphological structure can help L2 learners use words correctly in language production. It will guide learners in distinguishing possible forms of words from what is not possible. For instance, a verbal Action-Object compound is usually intransitive and cannot have a grammatical object after it. Thus, since the compound word 念书 *nian-shu* [read-book] 'to study' is an action-object construction, *念书中文 *nian-shu zhong-*

wen [read-book China-language] 'to study Chinese' is incorrect. Since 们 *men* is a plural suffix for people, *书们 *shu-men* [book-plural] 'books', *狗们 *gou-men* [dog-plural] 'dogs' are unacceptable in Chinese unless these objects or animals are humanized in children's stories or for rhetorical reasons. Some Chinese affixes like -子 *-zi*, -老 *-lao* are usually attached to a nominal monosyllabic root to form a disyllabic noun. Therefore, they usually cannot be used with a disyllabic compound or to form a [Root-Affix]-Root or Root-[Root-Affix] compound with the meaning of 'kind of N'. For example, there are 桌子 *zhuo-zi* [table-suffix] 'table', 书桌 *shu-zhuo* [book-table] 'desk', 桌布 *zhuo-bu* [table-cloth] 'tablecloth', but there is no *书桌子 *shu-zhuo-zi* [book-table-suffix] 'desk' or *桌子布 *zhuo-zi-bu* [table-suffix-cloth] 'tablecloth'. There are 老师 *lao-shi* [prefix-teacher] 'teacher', 师德 *shi-de* [teacher-virtue] 'the virtue of a teacher', but there is no *老师德 *lao-shi-de* [prefix-teacher-virtue] 'the virtue of a teacher'. Lastly, the knowledge of morphemes can help L2 learners avoid writing errors. For example, 有利 *you-li* [have-benefit] 'advantageous; beneficial; favorable' and 有力 *you-li* [have-strength] 'strong; powerful' are easily mixed up in writing since they are homophones but not synonyms. However, if learners pay attention to the second components in them, the error can be avoided.

8.2.2 Properties of Chinese Words

Chinese is a language in which most syllables are also morphemes. Some scholars claim that Chinese morphemes, which are represented by characters, are the basic and most important constituents of the language; thus, morphemes and characters are more important than 'words' in Chinese (Xu 1994a, 1994b; Mattingly and Hsiao 1997). As discussed in Chapter Five, the main word types in modern Chinese are monomorphemic

words, Root-Affix words, reduplications and compounds. Except for monomorphemic words which are only governed by inflectional morphological-principles, both inflectional and derivational morphological-principles apply to all the other types. Because of the properties of Chinese words, many studies suggest that morphemes need attention in the teaching of Chinese vocabulary (Wan 1989, Zhang 1990, Cui and Yang 1997). As mentioned at the beginning of this section, 4,220 lexical items are listed in *Han-yu Shui-Ping Ci-hui yu Han-zi Deng-ji Da-gang* <<汉语水平词汇与汉字等级大纲>> (Criteria for Chinese Vocabulary and Characters at Different Proficiency Levels) (1992) as words to be learned by students at the two stages of the intermediate Chinese level. About 71.3% of these words (3,010 words) are compounds, and many others are of the types of Root-Affix and reduplication. Very few of those 4,220 lexical items are monomorphemic words. Therefore, the main task of Chinese vocabulary teaching at the intermediate level is to introduce the knowledge of Chinese morphology, especially the structural knowledge of compounds, which can be applied to word acquisition,.

8.2.3 Techniques of Vocabulary Instruction

Psycholinguistic studies discussed in Chapter Two have shown that morphological structure is directly related to vocabulary performance and reading achievement. According to the Adaptive Control of Thought (ACT) Model of Anderson (1983), when learning anything new, the mind moves from declarative to procedural knowledge in three stages: a) the declarative stage (or cognitive stage) when new information is perceived as cognitive knowledge, b) the knowledge compilation stage (or the associative stage) when the mind tries to compile the information into more specific procedures and makes a general rule specific to a particular circumstance of application, and c) the tuning

productions stage (or the autonomous stage) when a working solution is arrived at. In classroom L2 learning, rather than speaking directly as they do in their native languages, L2 learners start with cognitive knowledge of a rule supplied by the teacher. This is particularly true for adult learners in foreign language contexts. Therefore, general rules of Chinese word structure and morphemes are better introduced in Chinese vocabulary teaching, especially in Chinese as foreign language context. In order to help L2 learners reach the knowledge compilation stage and the tuning productions stage, strategy training and practices are needed. The following sections discuss related pedagogical techniques.

A. Teaching characters within compounds or other disyllabic/polysyllabic words. At the intermediate level, L2 learners still have to learn more characters while studying new words. About 1,405 new characters should be acquired at this stage (see *Han-yu Shui-Ping Ci-hui yu Han-zi Deng-ji Da-gang* <<汉语水平词汇与汉字等级大纲>> 'Criteria for Chinese Vocabulary and Characters at Different Proficiency Levels', 1992). These new characters mostly appear in disyllabic or polysyllabic words as roots or morphemes (a few are used as syllabic marks for transliterations). Thus, characters should not be separated from words in vocabulary instruction and learning. Learners should study new characters, including forms, meanings and pronunciations at the same time when they learn new words that contain them. At the intermediate level, in addition to the form and the pronunciation, the morphemic meaning and function of each character should be made clear to students. The knowledge of morphemes can help them understand how the meaning of a polysyllabic word is derived. When they encounter familiar morphemes/characters in unfamiliar words, they will be able to infer the meanings of the words. For example, students have learned the character 生 *sheng* in the beginning

stage (i.e. in 学生 *xue-sheng* [study-person] 'student'). In the intermediate stage, they will come across more compounds with the character. At this time, its morphemic meanings should be introduced: when it is at the final position of a compound, it means 'person, or the agent who does something'; when it is at the initial position, it means 'life; to live; to be alive; to bear; to produce; to be raw/unripe'. New words with the character 生 *sheng* that students will soon encounter can be used as examples: 生命 *sheng-ming* [life-life] 'life', 生物 *sheng-wu* [live-thing] 'living things, living beings; organisms', 生日 *sheng-ri* [bear-day] 'birthday', 生母 *sheng-mu* [bear-mother] 'biological mother', 生词 *sheng-ci* [unripe-word] 'new word, unfamiliar word', 生产 *sheng-chan* [produce-produce] 'to produce; production'. When the morphemic meanings of 生 *sheng* are known, the meanings of these compounds can be understood easily. All the productive morphemes/characters can be introduced in this way. Usually, several morphemic meanings of a character may be derived from a basic meaning. In such a case, the basic meaning of a character should be introduced before its derived meanings. This approach relates the different meanings of a character to a central notion, which makes the learning process more natural and less mechanical than when the meanings are taken up separately.

Memory strategies for characters have been discussed in Section 8.1.3 (Pedagogical Methods of Vocabulary and Character Teaching). All the methods used at the beginning level can also be adopted at higher levels for memorization of new characters. Some exercises and games can be used to help students review characters and words. For instance, students may be asked to list the compounds or other polysyllabic words which contain a specific character as a morpheme, and present the meanings of some given words. Or students may be given a character and its different morphemic

meanings with some words containing the character as a component, and then be asked to find out what the morphemic meaning is in each of the given words. A circle game can be played by students at the intermediate-advanced stage: the teacher gives a disyllabic or polysyllabic word (e.g. 学生 *xue-sheng* 'student'), and asks student A to say out loud or write a word beginning with the final character of the given word (e.g. 生活 *sheng-huo* 'life'). Then, student B is supposed to find a word beginning with the final character of the word given by student A (e.g. 活动 *huo-dong* 'move; movable; activity'). The other students continue in this way around the circle.

B. Introducing word structures and types. As discussed above, most words that students encounter at the intermediate level are disyllabic-dimorphemic words. To understand these words, basic morphological knowledge is needed. On the other hand, as mentioned above, learners at this level have already acquired basic sentence grammar, high frequency words and characters, and they are ready to learn some morphological principles. Moreover, at this stage, the types of words learners will encounter are some monosyllabic words, a few Root-Affix words and Reduplications, but many compounds (71.3%, see Section 8.2.2). Obviously, compounds must be a focus in vocabulary teaching.

Monosyllabic words cannot be decomposed, so they have to be learned as a whole unit. Since all monosyllabic words are presented as single characters, the techniques and strategies of teaching and learning characters discussed in the previous section (Section 8.1.3) apply here as well. Some monosyllabic words may be used as components in compounds, and their morphemic meanings and the related compounds can be introduced to students together. Monosyllabic words for the intermediate level students contain some

measure words. The cognitive meanings and their collocations with nouns, as discussed in Chapter Seven of the present study, should also be taught to learners.

For Root-Affix words, the meanings and functions of the affixes should be introduced to help learners understand the words and know how to use them. Reduplications mainly have three types: nominal reduplications, verbal reduplications and adjective reduplications. The semantic meanings of each pattern are governed by some general rules: nominal reduplications usually mean 'every N' (except for the addresses of family members); verbal reduplications mean 'V a little; try to V' or 'repeat some actions'(the V1V1V2V2 pattern); adjective reduplications usually describe some features vividly with the meaning of 'very A' or 'some are A, some are B' (the AABB pattern; see Chapter 5). Such principles lead L2 learners to a better understanding of the mechanisms and functions of reduplication in Chinese.

As presented in Chapter Six, there are three main types of compounds in Chinese: endocentric compounds, exocentric compounds and parallel compounds. Each of the structures can be taught as the specific type occurs in the text with a sufficient number of words to illustrate. As discussed in Chapter Six, the syntactic relations of the components in Chinese compounds are similar to their corresponding sentence structures. Since L2 learners have already learned the basic sentence-structures at the intermediate level, they can easily transfer them to the relations of roots in compounds. However, the more important task for them is to understand the semantic relationships of the roots in order to derive the meanings of the compounds. The semantic patterns of Chinese compounds discussed in Chapter Six should be the focus of vocabulary teaching. The order of

teaching the three main types should be: endocentric, parallel, and exocentric. This is justified below.

Among Chinese disyllabic compounds, 95% of them comprise nouns (51%), verbs (36.4%) and adjectives (7.6%) (Yuan and Huang 1998). Therefore, these three categories are the main content of vocabulary instruction. Since nouns form the largest category and since 80.6% of nominal compounds in Chinese are endocentric (Yuan and Huang 1998), it makes good sense to introduce the endocentric type first. Moreover, since the semantic relationships of the components in endocentric compounds are either universal or semi-universal, and nearly every pattern can be found in English compounds (see Chapter 6), L2 learners with English L1 have already acquired the knowledge of the structure of these compounds and are ready to learn them in Chinese.[2]

The meanings of parallel compounds are also easy to understand: it is either the same as one of the components or the simple composition of the two components. Furthermore, about 27% of verbal compounds and 62.5% of adjective compounds are parallel compounds in Chinese. For these reasons, parallel compounds should be introduced right after endocentric compounds.

Most of the exocentric compounds in Chinese are verbs or adjectives (state verbs). The semantic patterns of the components in such compounds are somewhat complex, and

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Note: 2. This process matches the Input Hypothesis Model (Krashen 1985) and formal-instruction theory: successful instruction should provide level-appropriate language knowledge that learners are ready to learn.

some of them, like the Action-Result compounds, may have some unique syntactic functions in sentences. Thus, it is logical to introduce this type later.

Some related exercises/drills can be used to help students analyze word structures. For example, students can be given some known compounds or other polysyllabic words and be asked to describe the morphemic meanings of the components, the structure patterns of the words, the semantic relationships between the components and the meanings of the whole words. Alternatively, they can be given some unfamiliar compounds to analyze their structures and to infer their meanings. The compounds must be morphologically transparent, i.e. the compound meaning should be derivable from its roots. If some roots in the compounds are unfamiliar to the students, their meanings should be explained first.

C. Teaching new words and word patterns within contexts. "Context can be viewed as morphological, syntactic, and discourse information in a given text which can be classified and described in terms of general features" (Carter and McCarthy 1988, p. 102). Here, a context means a sentence or a short text in which the reader already has some background knowledge of the subject matter. Contexts are very important in vocabulary acquisition. Research has concluded that new vocabulary items should not be presented in isolation and should not be learned in rote fashion (Hulstijn 1997).

First, contexts can help L2 learners understand new words better. L2 learners initially approach the learning of words as translation. However, first language translation or glosses sometimes cannot accurately represent the meanings and functions of words in their target language. One meaning or concept may be expressed by several words in different contexts and language styles, and one word may also have different semantic and

cognitive meanings in different langauges. For example, Chinese 开 *kai* means 'open', but it can be used in cases where the English *open* cannot: 开 灯 *kai-deng* [open-light] 'to turn on a light', 开车 *kai-che* [open-car] 'to drive a car', 开会 *kai-hui* [open-meeting] 'to hold/attend a meeting'. The reason is that the cognitive meaning of Chinese 开 *kai* is different from or not equal to the cognitive meaning of English *open*. Chinese 开 *kai* contains the meaning of 'to start' in English. One solution to this kind of problem is massive exposure to the target language in contexts. "The full meaning of words (which includes their sociolinguistic contexts) can only come from encountering them in a rich linguistic environment.... Words should be reviewed and revised constantly, for without this the learner cannot come to know their polysemic and registerial characteristics" (Carter and McCarthy 1988, p.45). Moreover, as discussed in Chapter Three of the present study, contexts are often necessary to infer the meanings of unfamiliar words, especially words with opaque meanings (i.e. meanings that cannot be derived directly from the components). Shu, Anderson and Zhang (1995) also show that "although Chinese word components usually provide semantic category information, obtaining the exact meaning of a word requires integrating the information from word structure and context" (p. 89).

Second, when students study new words within contexts, they practice both vocabulary and sentences. The final goal of vocabulary teaching is to help learners produce correct expressions of the target language with rich and appropriate words. To acquire a word does not only mean to understand its meaning, but also entails 1) knowing the use of it according to variations of function and situation, 2) knowing the syntactic behavior associated with the word, 3) having the knowledge of the network of

associations between the word and others in the language, and 4) knowing many of the different meanings associated with the word. Contexts not only can tell students the meanings of a new word, but also provide the collocations and its syntactic functions. Contexts can truly allow learners to have detailed comprehension of a word and to be ready to produce it in the target language.

Third, contexts can help L2 learners of Chinese identify word boundaries. As mentioned before, there is no overt word boundary marking in the Chinese writing system. Whether a character is a word or not can be decided by the context (sentence) it appears in and/or by its morphological features. Native Chinese speakers are used to judging words by contextual information, but L2 learners usually feel it is difficult to determine whether adjacent characters belong to be same word or different words. When new words are taught within contexts, L2 learners will gradually get used to identifying word boundaries in sentences.

Many methods can help students learn, understand and review words within contexts. When a new word is introduced, the teacher can give some typical sentences containing the word as examples. Students may also be asked to identify similar sentences from newspapers, magazines or other reading materials (either provided by the teacher or picked out by the students themselves), in order to study them. Finally, they can try to use the word by filling in blanks of texts, or by producing it in Chinese writing and speaking. There are also ways to help students review words they have learned. For example, some adjectives that students have learned can be presented, and students are asked to list the objects or events that are described by the given adjectives. An object, an action or a story can be shown by pictures or mimes, and students are asked to use the words they

have learned to describe them (The pictures and mimes used may be drawn or played by the students themselves).

D. Training students in adopting effective strategies to understand and remember new words. Strategy training helps students bridge the gap between 'knowing what' and 'knowing how' in their target language learning. As it is impossible to teach learners all the words they need to know in class, it is important to teach them some inferencing strategies that will enable them to tackle unknown words and free them from total reliance on dictionaries, teachers and textbooks. Chapter Two of this dissertation discusses previous studies on the positive efficacy of strategy use and strategy training. The results of Fraser's study (1999) also show the efficacy of instruction that aims to improve L2 learners' ability to infer new word meanings. Hulstijn (1997) argues that it is especially worthwhile to talk about vocabulary learning techniques with students at the intermediate and advanced levels. First, it is those students who feel the vocabulary learning burden most pressingly, because they have to increase a limited elementary vocabulary of 1000 items to 5000 items or beyond. Second, "intermediate or advanced students have enough L2 knowledge (1) to participate with profit in a metalinguistic group discussion on mnemonics, and (2) to form associations within the L2, rather than between L2 and L1" (Hulstijn 1997, p. 217). Chapter Four of this dissertation also shows that L2 learners of Chinese have to be trained with some effective strategies used by native Chinese speakers in vocabulary comprehension and memory storage. The practical methods introduced above, such as analyzing the structures of words, deriving the meanings of compounds from their components, and learning new words with contexts, are in fact learning strategies as well.

In vocabulary learning, two kinds of strategies are usually mentioned: those of comprehension and of mnemonics. The strategies of comprehension include translation, consulting, inferencing, deduction and contextualisation. Translation and consulting (i.e. consulting teachers, native speakers, dictionaries, etc.) are both commonly used in all language-learning and are excluded from this discussion. Deduction is to apply L2 rules to understand word meanings, and contextualisation is to use contextual information (e.g. world knowledge, sentence grammar, discourse, word association and punctuation) to reach the meanings of words. Both of them are used in inferencing. Thus, inferencing is the main strategy of comprehension discussed here. Inferencing should be stressed in Chinese vocabulary learning when L2 learners have learned the knowledge of character structure, common radicals and word structures. The reasons are: 1) Inferencing strengthens the cognitive associations between words and their meanings and extends learners' vocabulary more readily (Hulstijn 1993, Fraser 1999, Huckin and Coady 1999); it also can make words be better remembered (Hulstijn 1992). 2) L2 learners of Chinese, as shown in Chapter Four, need the strategy-training of inferencing to help them acquire Chinese words more effectively and independently. And 3), the properties of Chinese words allow inferencing to be more effective. As mentioned before, more than ten thousand common Chinese words are formed with 3,000 to 4,000 characters. An unfamiliar Chinese word that students encounter is most often just a new combination of familiar characters. Thus, the word meaning could possibly be deduced from the morphological structure and context.

It is claimed by scholars that strategy training should be explicit, that is, to inform "learners fully as to the strategies that they are being taught, the value and purpose of

employing these strategies, and ways that they can transfer the strategies to other learning tasks" (Weaver and Cohen 1998, p.93). The instructional model of strategy training is: strategy introduction → strategy practice → strategy autonomy. First, the teacher should introduce aimed strategies to students and raise their awareness. Second, students should practice and evaluate the strategies, and, if the strategies work well, they should also transfer them to new learning situations. Finally, learners are able to use the strategies automatically in further study. These steps also have to be completed in strategy training for L2 learners of Chinese.

First, the teacher should tell students how native Chinese speakers learn new words effectively and introduce the strategy to bring it to their awareness. Then, the teacher shows the students step by step how to infer the meanings of words by contextual information, word structure and morphemes, and radicals of characters. Each step can be separated from others in the beginning, but they can all be combined together later. For example, the teacher can list a new disyllabic compound and teach learners to analyze its possible meaning by the components and the word structure. The character radical can be used to find the semantic category if the meanings of the components are unclear. Finally, the word is put into several contexts which provide some clues to the word meaning, and the students are guided to find more information about the word meaning through different contexts.

The second step of the training is to practice using the strategy. Some short stories or texts containing several new words can be designed so that students may practice with the strategy. Paribakht and Wesche (1999) have found that characteristics of tasks, texts and inferred words influence learners' inferencing behavior. An inferencing

would be more successful when 1) the task is summary rather than question, 2) learners have the background knowledge of the reading text, and 3) knowledge of morphology, word-order and word categories can be applied to the inferred word. It also has been recognized that, "in order to guess the meanings of unknown words in context, the learner must be able to recognize on sight most of the surrounding words" (Huckin and Coady 1999, p. 184). Therefore, the Chinese text allowing students to infer word meanings should be designed as follows: 1) the content and topic should stimulate students' interest, and students should already have background schema of it; 2) the main content of the text should still be understandable without the meanings of the unfamiliar words; and 3) the new words of which students will infer meanings can be analyzed by the morphological knowledge and character knowledge that students have learned. Several types of drills can be adopted with such texts. Initially, the meanings of unfamiliar words can be listed randomly, and students are required to find out what meaning matches which word by reading the text and by analyzing the word structures and character radicals. When students have achieved mastery over this drill, they can move on to the next practice: explanations for new words are not given, and students themselves have to find out the meanings of the words from the contexts, the morphological structures and meanings of the morphemes, and the character radicals. These kinds of drills can also be combined with practice of speaking and writing. For example, the first time the students read a text, they can just ignore unfamiliar words but get the main idea of the text. Then, they are asked to tell or write down the main idea in their own words. Finally, they read the text again and try to find the exact meanings of the unfamiliar words. When the meanings of these words are found, the students can be led further to find out the syntactic functions

and collocations of these words. All the practice can be done in class or completed as homework.

After students have worked with the strategy, they will also evaluate its effectiveness within their learning process. If the meaning of an unfamiliar word cannot be determined by the students, the teacher could help them find the reasons for their difficulties and help them improve their skills in using this strategy. Dictionaries can be used after inferencing to verify the answers and to check the pronunciations.

Beside the strategy of vocabulary comprehension, students also need to adopt some strategies for memorizing words. As discussed in Chapter Two of this study, psycholinguistic studies have found that words are stored as networks in the mental lexicon. The networks are built up based on different associations of words, such as semantic categories, relations of sounds, descriptive features. If words can be related together by a kind of association, they will be easier to store in memory. Psycholinguistic studies in Chinese have also found that Chinese characters form different associative networks from those formed by English spelling, and that characters play a greater role in memory than English words written in letters (Hoosain 1991). Moreover, "Chinese words presented visually were remembered better than those presented orally" (Hoosain 1991, p. 77). This is because characters represent meanings directly, and the visual code provides useful cues for the recall of items which are not available in the phonological code. The studies imply that word memory in Chinese can be greatly facilitated by the written form of the words. Based on the properties of Chinese words, the following mnemonic strategies can be taught to students at the intermediate level: grouping, recombination, and categorization on the basis of written characters. Grouping is listing related words

together to enhance storage in memory. It was presented in Section 8.1.3 that students can be taught to group characters with the same radical together to memorize them. That is one type of grouping. In modern Chinese, many compounds share the same root/morpheme/character, and the meanings of these compounds are related because of the same component. All such compounds can be grouped together for memorization. For example, students can be taught to list together the compounds containing the same character for reviewing purposes. Word groupings may also be based on word structure: words with the same structure type are grouped together. Recombination is to put together smaller meaningful units into new combinations. While learning Chinese words, L2 learners can be trained to recombine characters they have learned to make polysyllabic words, and then further combine them into phrases and sentences. The teacher can give students a productive morpheme/character, and the students give orally or write down all the words they remember which contain that morpheme/character. After that, they make sentences with those words. Categorization is to place together the words belonging to the same semantic or syntactic category, such as furniture, instruments, professions, courses, colors, temperature; or measure words, conjunctions, actions, and so on. Channell (1988) claims that "vocabulary teaching should make overt associations between semantically related words" (p. 90), and this is because vocabulary access in the mental lexicon is via meanings. Several exercises can train students how to use this strategy. For instance, 1) the teacher or the textbook provides a picture of an object, such as a house, a car or a bicycle, and asks students to mark out each part of the object; 2) the instructor lists a category and asks students to give as many words belonging to this category as they can; and 3) when a new word is introduced, students are asked to place the word in

different categories as they see fit, and in the categories where the words can be linked with other words they have learned.

In general, the main goal of vocabulary pedagogy for the students at the intermediate Chinese level is to increase their potential vocabulary (the words they can understand) as much as possible. In order to help L2 learners understand a large number of new words quickly, two main tasks have to be accomplished in the instruction of Chinese vocabulary: 1) teaching students Chinese morphology, i.e. the knowledge of common morphemes, the structure types of Chinese words and the semantic patterns of word components; and 2) training learners to use some effective strategies for inferring the meanings of unfamiliar words and for memorizing a large number of new words. These two tasks must be considered in textbook design. When certain words appear in texts, related morphological knowledge and practice should also be introduced and designed. Moreover, each text should not contain too many new words. Many current textbooks for the intermediate-level students usually introduce more than 30 new lexical items in each lesson. This design causes learners to feel overwhelmed by the task of not only understanding the text but also trying to remember many new words in a short period of time. According to the Input Theory of Krashen (1982, 1989), teaching methods succeed according to the extent that there is comprehensible input. Sheer language exposure without comprehension is often useless to acquisition. Therefore, the new words in each text must be limited to a certain number so that they do not hinder comprehension of a text. Furthermore, the current new words must repeatedly appear in the next few texts. Then and only then can language exposure facilitate vocabulary comprehension and storage.

8.3 Pedagogical Applications at the Advanced Level

At the advanced level, the goal of language teaching is to help L2 students reach a near-native proficiency level. During this phase, L2 learners will continue to learn new words through reading and listening. Moreover, they must practice producing longer stretches of discourse, such as making oral presentations, discussing ideas and opinions, and writing short papers. This is the time that learners get detailed comprehension or precise knowledge of the words they have learned by listening and reading, and then produce these words in their own speech and writing. Vocabulary tasks at this level are 1) to develop the knowledge of potential words to be productive words, and 2) to learn more words which are less frequently encountered. In order to accomplish these tasks, students must be involved in more language interactions.

Vocabulary teaching at the advanced Chinese level involves all aspects of language training: listening, speaking, reading and writing. Teaching methods should include the following:

A. Helping L2 learners of Chinese infer the meanings of unfamiliar words automatically. At the advanced level, students will read a lot of Chinese material on different topics, and they will also encounter many unfamiliar words in reading. Students have to improve their reading speed and skill, and they cannot consult a dictionary for every unfamiliar word. On the other hand, according to *Han-yu Shui-Ping Ci-hui yu Han-zi Deng-ji Da-gang* <<汉语水平词汇与汉字等级大纲>> (Criteria for Chinese Vocabulary and Characters at Different Proficiency Levels) (1992), only 700 new characters are learned at the advanced level. This means many new words that L2 learners

encounter at this level are the combinations of familiar characters, and the meanings can be inferred easily. Therefore, students must be encouraged to use the inferencing strategies which they have learned earlier as often as they can in their readings. More practice in using the strategies can be done both in or out of the classroom until learners can use this method automatically.

B. Helping L2 learners turn their potential vocabulary into productive vocabulary. A good way to increase language production is language interaction and practice. Many exercises help L2 learners use words they already know in their language production. For instance, students can try to fill in the blanks with appropriate words in texts, to write papers with required words, or to translate short articles or stories with required words and sentence structures from their L1 into Chinese. A strategy of word imagination, as suggested by some scholars (Zhang 1990, Lin 1997), can be taught to help students remember words, and to create their associations and collocations. When a new word and its meaning are learned, students are asked to give other Chinese words which can be related to the new word. For example, when the new word 海洋 *hai-yang* [sea-ocean] 'ocean' is learned, students are asked to orally give other words associated with it: 深 *shen* 'deep', 宽广 *kuan-guang* [wide-wide] 'wide', 蓝 *lan* 'blue', 波浪 *bo-lang* [wave-wave] 'wave', 船 *chuan* 'ship', etc. This practice can help learners create word associations in their minds, and when they want to produce Chinese, they can find the proper words. Moreover, the strategy of categorization introduced at the intermediate level can also be used at the advanced level.

C. Helping L2 learners understand collocations, social meanings and styles of words. In each language, there are some words with similar semantic contents but that

are collocated with different lexical items and have different syntactic functions, style registers or social meanings (i.e. to be used in different styles, to have emotional differences or gender differences). Using words appropriately is an important task for L2 learners of Chinese, especially at the advanced level when more language production has to occur. It has been found that collocations present a major learning problem for advanced students (Bahns and Eldaw 1993). Beside observing usage and collocations of words in reading and listening, students also have to be taught the different social meanings and usage of words. Some practices with this focus in mind are helpful. For example, 1) have students read some sentences or phrases which contain two or more words with similar semantic meanings, and then ask them to find out the different collocations and social meanings of these words by contexts; 2) give students some texts together with words in different styles, and ask them to figure out which words fit in which texts; and finally 3) give students some words of which the semantic meanings are similar, and require them to make as many sentences as they can with these given words.

D. Introducing lexical phrases in Chinese. Vocabulary is not just words. Besides the basic four types of Chinese words (monomorphemic words, reduplications, Root-Affix words, compounds), there are other forms that might be considered lexical items: abbreviations, idioms, and proverbs. All of these expressions are lexicalized phrases with fixed or semi-fixed patterns and specific meanings, and they are stored and used as single units. Moreover, there are also many situational utterances in Chinese, such as interjections and sentence particles. Not all of them are basic and high-frequency lexical items in Chinese, but they will be heard in speech and seen in reading, especially at the advanced level, and will also lead to fluency in Chinese comprehension and production.

On the other hand, some of them may be difficult to understand simply through context, and thus, are nearly impossible to acquire just by incidental language exposure. Therefore, Chinese vocabulary instruction should teach them.

As discussed in Chapter Five, abbreviation can be regarded as a special word pattern, and it is possible to shorten complex words and nominal phrases with more than three syllables into abbreviations. Some general rules can guide the formation of abbreviations (see Chapter 5). At the advanced level, students will encounter many abbreviations in their reading. It is necessary to introduce the general principles of formation for Chinese abbreviations in order to help students understand the meanings of such special expressions. Both the original forms and the abbreviated forms should be listed to show students how long words or expressions can be shortened. In the 3,569 words listed in *Han-yu Shui-Ping Ci-hui yu Han-zi Deng-ji Da-gang* <<汉语水平词汇与汉字等级大纲>> (Criteria for Chinese Vocabulary and Characters at Different Proficiency Levels) (1992) for the advanced-level students, abbreviations are not included. However, it is better to list some common abbreviations and their original forms as a guide in textbooks.

There are also many fixed idioms occurring in colloquial speech and reading materials in Modern Chinese. Some of their meanings sometimes may be inferred from context. Most idioms, however, are allusions to historical events and legends, and their meanings are not easily inferred from either context or word structures. In order to understand their meanings, students should be taught how the idioms are derived. Thus, the historical events or legends associated with some commonly used idioms must be introduced to students in order to help them better understand their meanings. As many

idioms are derived from classical Chinese, it will be beneficial for L2 learners at the advanced level to learn some classical Chinese. Dictionaries of Chinese idioms are useful tools to be introduced to the students at this stage.

As with idioms, the meanings of some proverbs may be understood through contextual information, but most of them have to be taught. In Modern Chinese, there is a unique type of proverb called '歇后语 *xie-hou-yu*'. They are composed of two parts. The first part is a description which intended to be a riddle, and the second part is the answer to the riddle and is often a metaphor or homonym of what is intended. For example, 猪鼻子插葱------装象 (装像) *Zhu bi-zi cha cong ------ zhuang xiang* (*zhuang-xiang*) [pig nose insert green-onions --- disguise elephant (pretend)] 'to insert green onions into the nose of a pig --- to disguise as an elephant (i.e. to pretend)'. The second part 装象 *zhuang xiang* is a homonym of another word 装像 *zhuang-xiang* which means 'to pretend, to do something for appearance's sake', and this is the true meaning of the proverb. Those proverbs use two rhetorical devices: riddle and homonym. They are not easily understood by L2 learners of Chinese. Most often, only the first part is used, and this makes it even harder to understand. In such cases, some elaborate and explanations is needed.

Interjections and sentence particles are frequently used in colloquial Chinese. They usually express people's feelings, emotions, opinions and other modality meanings. From the several studies on them (e.g. Chao 1968, Chapter 8; Chu 1983, Section 1.5.2; Chu 1998, Chapter 4; Xu 1994), each interjection seems to have a core meaning from which various interpretations are derived on the basis of the contexts. As they can hardly be pinned down for precise meanings, L2 learners of Chinese learn only some specific uses

from the stage of the beginning Chinese level. At the advanced level, the core meanings of such interjections and sentence particles can be introduced from which various interpretations are derivable. It will help learners understand and produce coherent Chinese discourse.

8.4 Conclusion

This chapter has discussed Chinese vocabulary pedagogy from the beginning level class to the advanced level class. Table 8.2 below shows the suggested pedagogical model. At the beginning level, vocabulary teaching must focus on basic characters by introducing radicals and structures. A related strategy training is to teach students how to use radicals to learn and remember characters. At the intermediate level, the main goal of vocabulary teaching is to enlarge potential words of L2 learners and achieve the production to some degree (i.e. to use them in some particular texts). Morphemes and word structures must be introduced, and effective strategies for inferring the meanings of unfamiliar words and strategies for memorizing new words should also be taught. At the advanced level, the main goal is to help students to turn their potential words into productive ones, that is, to use words they learned in a native-like manner. A great quantity of language interactions are necessary. Inferencing should become an automatic strategy used by students, and the strategy of word imagination can also be used to help students create word associations and collocations. Moreover, abbreviations, proverbs, idioms and the social meanings of words must also be introduced in vocabulary teaching in this stage.

Table 8.2 The Vocabulary Pedagogy of CSL/CFL

Goal	Content	Strategy Training
Beginning Level		
Basic Characters	Character Radicals Character Structure Core Characters and Words	1. Character Decomposition (to memorize characters by radicals and components) 2. Radical Grouping (to group characters with the same radical together to review)
Intermediate Level		
1. To enlarge potential words 2. Word Production (Inter-language way)	High-frequency Words Morphological Knowledge	1. Inferencing (to infer the meanings of unfamiliar words by contexts, word structure and character radicals.) 2. Contextualisation (to learn new words in contexts.) 3. Categorization (to relate words by semantic categories.) 4. Grouping (to group compounds containing the same component together for memorization and review.)
Advanced Level		
Word Production (Native-like way)	Less-common or Fewer-frequency Words and Lexical Phrases Vocabulary Production	1. Inferencing 2. Language Interaction 3. Word Imagination (to create collocational associations of words)

This model is based on both the features of Chinese words and the properties of SLA learning and teaching. It makes Chinese vocabulary teaching more systematic and can help L2 learners of Chinese acquire Chinese words faster and more effectively.

Certainly, the degree of its efficacy still has to be tested in practical situation of vocabulary learning and teaching in the future.

CHAPTER 9
CONCLUSIONS

This dissertation has studied problems on word acquisition of L2 learners of Chinese, principles of Chinese word structure, and Chinese vocabulary pedagogy. It consists of four main parts: 1) theories about words and word acquisition and their implications, 2) experimental studies on the ways of dealing with unfamiliar words by both native Chinese speakers and L2 learners of Chinese, 3) characteristics and general rules of Chinese word structure and semantic meanings, and 4) a systematic pedagogy of Chinese words to L2 learners.

Problems on L2 word acquisition did not attract much attention until the 1980s. Since then, the area of study has been developing very fast and has achieved great results. Theories of SLA point out that appropriate use of strategies contributes to success in language acquisition. They also conclude that classroom instruction facilitates language acquisition when it 1) can present modified language knowledge to match the stage of learners' acquisition process, 2) can provide and focus learners' attention on language rules that they cannot derive easily, 3) can train learners to use effective learning strategies, and 4) can provide them with adequate opportunities for language interaction. Psycholinguistic studies have found that morphological units of words are stored in the mental lexicon, and that morphological structure plays an important role in word learning of native speakers and is related directly to vocabulary performance and reading

achievement. This indicates that vocabulary acquisition and teaching must pay attention to morphological knowledge of words.

Compared to the various studies of vocabulary acquisition in ESL/EFL, the study of Chinese vocabulary acquisition lags so behind that little attention has been paid to it. In Modern Chinese, words are morpheme based. More than 80% of words are compounds and the meanings of many words can be inferred through their word structure and component morphemes. Because of this, psycholinguistic studies on Chinese word recognition have found that morphological structure is more important to vocabulary recognition and lexicon memory in Chinese than in many other languages. However, the features of Chinese vocabulary have not been taken advantage of in Chinese vocabulary pedagogy.

In Chapters Three and Four, the results of experimental studies on word learning problems of both native Chinese speakers and L2 learners of Chinese indicate that the knowledge of word structure is very important in learning new words. By means of surveys, tests and interviews, it has been found that native Chinese speakers frequently infer the meanings of unfamiliar words in reading by contextual information, morphological knowledge and the knowledge of character radicals. It was also found that the higher educational level a native speaker was, the more inferences were performed and more success was achieved. Conversely, L2 learners of Chinese seldom inferred the meanings of unfamiliar words because they did not have enough knowledge of Chinese word structure and character radicals. Furthermore, they lacked the strategy training. Most learners merely memorized Chinese words individually from their textbooks. As a result, vocabulary learning was the hardest and most arduous task in their Chinese

acquisition. The results of the investigations indicate that, in order to speed up vocabulary acquisition and lighten the heavy burden of acquiring an enormous number of words, Chinese morphological knowledge and character radical knowledge must be incorporated into classroom instruction, and that the strategies of inferring word meanings by such knowledge also should be part of the training.

Chinese words consist of four main structure types: mono-morphemic words, reduplications, root-affix, and root-root compounds. Abbreviation can also be regarded as a special type. Except for mono-morphemic words, the syntactic functions and semantic meanings of all other types, as discussed in Chapters Five and Six, are governed by morphological and syntactic rules. All the rules can help L2 learners of Chinese understand word meanings and know how to use them more easily and more effectively. Moreover, as Chinese syllables are written in characters, character structures and radical knowledge can also be used to get the meanings of words, either mono-morphemic or poly-morphemic.

Chinese uses classifiers heavily. When a noun is modified by a numeral or a demonstrative word, a measure word or classifier is needed. Moreover, verbs may also be modified by numerals and specific measures. There are hundreds of measure words in Chinese, and most of them are mono-morphemic in shape. The collocation of Chinese classifiers and nouns is one of the most difficult tasks for L2 learners whose first languages do not use classifiers as often. Chapter Seven shows that such collocations are governed by the cognitive meanings of nouns and classifiers. If the cognitive meanings are explained to L2 learners of Chinese, the learning difficulty can be notably reduced.

Chinese localizers are words or suffixes after nouns to express locations. If a noun is not the proper name of a place, a localizer is needed when the noun follows a locative or directional preposition. Chapter Seven lists all the localizers in Chinese and discusses four most common locative suffixes in detail: 上 *shang* 'above; up', 下 *xia* 'down; below; under', 里 *li* 'inside', and 中 *zhong* 'middle; center'. The appropriate use of each is not easy for L2 learners because the choice is not entirely decided by syntactic rules or by their semantic content. Native Chinese speakers use them on the basis of the cognitive features of the objects, i.e. the perceptual properties of located trajectors and their landmarks. In general, 上 *shang* tells that the position of a trajector is relative to a landmark below or under it. From this basic meaning, it indicates a position on/above the surface of a landmark or at the top area of a landmark. The function can also be extended to abstract concepts treated as two-dimensional surfaces by Chinese speakers. The function of 下 xia is contrary to that of 上 *shang*. It basically indicates that the position of a trajector is below or under a landmark (either attached to or below it) or in the bottom area of a landmark. It can also be extended to abstract nouns for conditions, situations, environments or atmospheres which can be viewed as landmarks covering an object. 里 *li* indicates that the location of a trajector is relative to what is outside a landmark. By this basic meaning, it tells that a position is inside a container, an area with borders or edges, or inside a border or an edge of a space. Its function can be extended to state a location inside a group of people, a period of time, a position or situation invisible or unknown to a specific person or persons. 中 *zhong* means that the position of a trajector is in a landmark and that it is only relative to the landmark itself. It generally refers to a position in a space without a border/edges or its border/edges is/are ignored. As 里 *li*, it can also

indicate a position in a place/area or a group. By extension, it locates a position in a state or a proceeding action. Only when L2 learners of Chinese know the cognitive meanings of the locative suffixes and how Chinese speakers recognize objects perceptually can they understand how to use those localizers.

Based on the study results in previous chapters, Chapter Eight discusses their pedagogical implications at different Chinese levels and formulates a systematic vocabulary pedagogy for the teaching of CFL/CSL. This study argues: at each level of acquisition, L2 learners should learn not only proper words but also the relevant knowledge of word structure, and they should be trained to use learning strategies in different ways. At the beginning level, students should learn core words, basic radicals and character structures. Meanwhile, they must be trained to use their knowledge of radicals to learn and memorize new words. At the intermediate level, L2 learners of Chinese will study high-frequency words and the knowledge of Chinese morphology. Related strategy training includes how to understand, memorize and acquire new words by contextual information, knowledge of word structure and character radicals. At the advanced level, students will learn less common and lower-frequency words and lexical phrases. For this purpose, they should have sufficient opportunities for language interaction (including reading, writing, listening and speaking) to recognize and produce Chinese vocabulary. Learners must use all the effective learning strategies they have been trained before, and by language practice, turn their potential words into productive words and use them in a native-like way.

This dissertation discusses problems of Chinese vocabulary learning and pedagogy through the theories of SLA, the results of psycholinguistic studies, the experimental

results of Chinese word learning, and the properties of Chinese words. It is a work that focuses on Chinese vocabulary acquisition in CFL/CSL and studies it systematically from different aspects. This study has presented many problems in both Chinese vocabulary acquisition and Chinese word study that have been so far ignored or unsettled. It has attempted to solve some of them. I hope that it has provided some means for further research on vocabulary acquisition in both SLA and CFL/CSL.

APPENDIX A
SURVEY AND WORD TEST FOR NATIVE CHINESE SPEAKERS

1. Survey

此问卷调查的目的是为了分析中国人与外国人在学习汉语词汇时有什么显著的不同。其结果仅供研究。请对所有问题作坦率回答。非常感谢您的帮助与合作。

1 您的文化水平是

A 小学　B 中学　C 中专　D 大专以上

2 您经常阅读的读物是(可选择多项)

A 课本　B 报刊杂志　C 文学作品

D 学术文章

3 当您在阅读中遇到不认识的字词时，您是

A 马上查字/词典或询问别人

B 先猜一猜意思，再查字/词典

C 只是猜测意思，很少查字/词典

D 其他(请列出)

4 若您要猜测某个字词的意思，您所用于猜测的依据常常是(可选择多项)

A 上下文　B 字的偏旁部首　C 词的结构方式

D 其他(请列出)

2. Word Test

下列划线部分的字词较为生僻，或是方言词，或是古语词，或是术语词。请不查字典与词典，也不询问他人，简单解释他们的意思(如：某种植物，某种动物，等)。对于不认识或意思不清楚的字词，请一律在旁标上问号“?”，再尽量写出您所能猜测到的意思。有些字词会在A、B两部分重复出现，请按顺序做。若您在B处猜得某个字词的意思，请不要更改或加补您在A处已写下的意义与留下的空白。

A

西饼屋	生荒	抓膘	巨观
薅草	视阀	植字	绦子
槎	组胺	萌孽	嗫嚅
螽斯	跳蝻	埯	羊踯躅
疍民	玢	捩	素磬
雉堞	砹	芙蕖	麇
蹀躞	薤头	迻译	舌鳎
栟榈	砗磲		

B

(1) 这么腌臜的东西，怎么能拿回家来?

(2) 这一片生荒的土地还有待于开发。

(3) 赑屃高昂着头，驼着这块巨大的石碑。

(4) 砗磲的壳可作装饰品。

(5) 素磬夏时开花，香味幽雅，常用以窨茶。

(6) 乘桴而浮于海。

(7) 蹀躞而行。

(8) 经费支绌。

(9) 清明时节雨纷纷，正是埯瓜埯豆的时辰。

(10) 猪架子长成，就要喂精饲料抓膘。

(11) 蛋民们居于水上，以船为家。

(12) 这种花有毒性，又称“羊蹄蹯”。

(13) 把口袋摽在车架子上。

(14) 笳内盛放着果品。

(15) 老婊姆有三个儿子，五个孙子。

APPENDIX B
SURVEY AND WORD TEST FOR L2 LEARNERS OF CHINESE

1. Survey

This survey is for studying the problems of Chinese vocabulary acquisition. Its purpose is to find an effective way of learning vocabulary. The result will be kept in strict confidentiality and will only be used in research. Your participation is completely voluntary, and you do not have to answer any question that you do not wish to answer. We highly appreciate your help and cooperation.

(1). Your first (native) language is:

(2). The other language(s) that you can speak is/are:

(3). You have finished the class of

a. beginning Chinese b. second year Chinese

c. third year Chinese d. fourth year Chinese or higher

(4). If you have taken the HSK test, your grade is:

(5). Usually your Chinese reading materials are (you can choose more than one answer)

a. your textbooks b. Chinese newspapers

c. Chinese literary works d. other (specify)

(6). You think that Chinese words are

a. easy to learn b. somewhat hard to learn

c. hard to learn d. extremely hard to learn

(7). When you come across an unknown word in your Chinese reading, you

a. look it up a dictionary immediately

b. ignore it

c. just guess its meaning

d. guess its meaning first, then check on it by a dictionary

(8). The Chinese words that you have learned are mainly from

a. textbooks b. your outside reading

c. memorizing words directly from dictionaries

(9). How do you study Chinese words?

a. try to memorize the words in your textbooks only

b. try to memorize all words that you come across

c. try to memorize words by grouping together ones that are similar or contain same characters

d. other (specify)

(10). Have you learned any knowledge about Chinese word structure before? If you have learned, do you feel the knowledge is helpful to your Chinese word learning or not?

2. Word Test

请不查词典，简单解释下列划线部分的词的意思。您可以用归类的方法解释(例如：一种动物，一种液体，一种植物，一种用手或者用嘴的动作，等等)。对于您所不认识或者不熟悉的词，请一律

在旁边标上问号"?", 然后写出您所能猜到的意思。(请用中文或英文解释)

Please simply explain the meanings of the following underlined words without consulting a dictionary. You can just explain them in terms of their general categories (e.g. an animal, a liquid, a plant, an action with hands or mouth, etc.). If there is a word that you do not know, please mark it with "?", and then try to guess the meaning. (Please explain the meaning in Chinese or English)

A

(1) 茅草　菊花　香蕉　橡树

(2) 椰子汁　橄榄油　馄饨汤　溶液　氧气

(3) 吮吸　吞咽　踏　蹦

(4) 狐狸　狼狗　骆驼

(5) 鹰　鸽子

B

(1) 水面上开着红红白白的荷花, 飘来一阵阵香味。

(2) 他喝了一杯茅台酒。

(3) 这几天总是下雨, 空气很潮湿。

(4) 他的自行车轮子没有气了, 得去打气。

(5) 妈妈熬了一锅鸡汤。

(6) 大家走进屋子, 坐在板凳或者椅子上, 准备开会。

(7) 我的电脑装了视窗-95软件。

(8) 现在, 癌症仍然是一种严重威胁人类生命的疾病。

(9) 从长江引来的水解决了农田灌溉问题。

(10) 他在门口踌躇着，不知道是应该进去还是离开。

APPENDIX C
COMMON CHARACTER RADICALS

十 'ten; hand; grass'	厂 'roof; shed'	刂(刀) 'knif'
亻(人) 'person'	八 'depart; handle'	冫 'ice'
人(𠆢,) 'roof; cover'	勹 'wrap'	儿 'person; child'
几( ) 'small table; pass'	讠(言) 'speech'	阝 (left side) 'mountain, hill'
阝 (right side) 'village'	力 'arm; strength'	又 'hand'
扌(手) 'hand'	工 'work'	土 'soil'
士 '(commendable) person; soldier'		艹 'grass'
大 'big, huge'	小 'small	口 'mouth'
口 'enclose; space; room'	巾 'cloth'	山 'mountain, hill'
彳 'foot; walk'	犭(犬) 'dog; fur-bearing animal	
夕 'sun-set; evening'	饣(食) 'food'	广 'roof; cover; space'
忄(心) 'heart'	门 'door'	氵(水) 'water'
辶(走) 'walk'	尸 'body; roof'	弓 'bow'
子 'child; son'	女 'woman'	纟 'silk'
马 'horse'	王 (玉) 'king; jade'	木 'wood; tree'
歹 'die'	车 'vehicle	戈 'dagger-axe'
瓦 'earthenware'	止 'toe; walk; stop'	日(曰) 'sun'
贝 'shell; money'	见 'see'	牛 'cattle'

毛 ‘hair’ 气 ‘air’ 攵 (文) ‘hand; literary’

片 ‘(wood) piece’ 斤 ‘axe’ 爪 ‘claw’

父 ‘father’ 月 ‘moon; meat’ 火 (灬) ‘fire’

礻(示) ‘sacrifice; ceremony’ 欠 ‘breathe out (with mouth)’

方 ‘square’ 户 ‘door’ 石 ‘stone’

目 ‘eye’ 田 ‘field’ 皿 ‘utensil; container’

钅(金) ‘gold; metal’ 禾 ‘standing grain’ 白 ‘white’

鸟 ‘bird’ 疒 ‘disease’ 立 ‘stand’

穴 ‘cave; hole’ 衤(衣) ‘cloth’ 母 ‘mother’

耳 ‘ear’ 页 ‘head; page’ 虫 ‘insect; worm’

缶 ‘container’ 舌 ‘tongue’ 竹 ‘bamboo’

自 ‘self’ 舟 ‘boat’ 羊 ‘sheep’

米 ‘rice’ 羽 ‘feather’ 酉 ‘wine; brew’

豕 ‘pig’ 足 ‘foot’ 身 ‘body’

雨 ‘rain’ 齿 ‘teeth’ 豸 ‘animal’

隹 ‘(short tail) bird’ 鱼 ‘fish’ 骨 ‘bone’

鬼 ‘ghost’

APPENDIX D
COMMON CLASSIFIERS NOT DISCUSSED IN CHAPTER 7

(1) Arrangement

串 *chuan* 'to string together; → string; bunch' classifies objects which are small and are strung together: 一串珠子 *yi chuan zhu-zi* [one string bead] 'a string of beads', 一串钥匙 *yi chuan yaoshi* [one string key] 'a bunch of keys'.

包 *bao* 'to wrap, to pack; → bag; box' classifies objects which are wrapped or packed: 一包 衣服 *yi bao yi-fu* [one bag clothes] 'a bundle of clothes', 两包烟 *liang bao yan* [two box cigarette] 'two packs/boxes of cigarettes'.

顶 *ding* 'top; → to carry on the head' only classifies caps, hats and helmets which are worn on the head.

堆 *dui* 'to pile up; to heap up → heap, pile, stack' classifies objects which are in heap, pile or stack: 一堆草 *yi dui cao* [one heap hay] 'a heap of hay', 一堆垃圾 *yi dui laji* [one heap garbage] 'a heap of garbage'.

发 *fa* 'to send out; to shoot' is the classifier for bullets and shells which are round in shape and are projected from a projectile.

封 *feng* 'to seal' only classifies letters which are usually sealed in envelopes.

卷 *juan* 'to roll up; to curl → roll' classifies objects which are rolled up: 一卷纸/胶卷 *yi juan zhi* / *jiao-juan* [one roll paper /plastic-roll] 'a roll of paper (tissue) / films'.

束 *shu* 'to bind, to tie; → bundle, bunch' is the classifier of objects which have long-shapes and are tied together: 一束花/草/柴 *yi shu hua/cao/chai* [one bunch flower/hay/firewood] 'a bunch of flowers/hays/firewood'.

(2) Division

层 *ceng* 'layer, tier' classifies objects which are in different layers or stories. E.g.: 三层楼 *san ceng lou* [three layer building] 'a three-story building', 两层纸 *liang ceng zhi* [two layer paper] 'two layers of papers'.

份 *fen* 'share, portion, set': 两份工作 *liang fen gong-zuo* [two portion work/job] 'two (different) works/jobs', 三份报 *san fen bao* [three share newspaper] 'three newspapers', 两份饭 *liang fen fan* [two set meal] 'two sets of a meal'.

号 *hao* 'number' classifies objects which are arranged in sequence and are marked by numbers: 三号门 *san hao men* [three number gate] 'gate number three', 六号鞋 *liu hao xie* [six number shoe] 'size-six shoes'.

届 *jie* 'session' is the classifier for conferences and meetings which are held regularly and students who graduate in different years: 第三届语言学会 *di san jie yu-yan-xue hui* [DI three session language-study meeting] 'the third conference of linguistics', 四届学生 *si jie xue-sheng* [four session student] 'students graduated in four years', 九八届毕业生 *jiu-ba jie bi-yie-sheng* [98 session finish-work-student] 'graduates of 1998'.

集 *ji* 'to gather; to collect → collection; volume; part' is the classifier for books, movies or TV plays which are in different volumes or parts.

(3) Instrument

幕 *mu* 'curtain; screen' classifies stage plays: 一幕话剧 *yi mu hua-ju* [one curtain speech-drama] 'an act of modern-drama'.

(4) Location

处 *chu* 'place' is the classifier for homesteads, scenes, and errors or problems on printed materials.

堂 *tang* means 'hall, main room'. It classifies class meetings (in school) and lectures which are held in classrooms or auditoriums. It also classifies furniture which are in a set to furnish a room or a hall.

所 *suo* 'place' classifies buildings, e.g. house, schools, institutes, hospitals, and post-offices.

位 *wei* 'site, seat' is a polite term which classifies people, such as customers, guests, friends, teachers, audience, etc. It never classifies derogatory forms for people like 坏蛋 *huai-dan* 'rotten egg, bad guy', 贼 *zei* 'thief', 罪犯 *zui-fan* 'criminal'. The corresponding 个 *ge* is used in a neutral sense.

座 *zuo* 'seat, place' classifies large objects which are in three-dimensional solid and are firmly located at a place: mountains, hills, reservoirs, multi-stories or tall buildings, bridges, sculptures and statues.

(5) Part of Object

栋 *dong* 'ridge-pole (of a house)' is a classifier of houses and buildings.

杆 *gan* 'pole, the shaft or arm of something' classifies objects which have a long arm or pole: flags, riffles, and steelyards.

户 *hu* 'door' is the specific classifier for households: 三户人家 *san hu ren-jia* [three door people-family] 'three households'.

架 *jia* means 'frame, rack'. It is the classifier for machines or something with a frame or rack: cameras (generally, larger than those pocket-size one), airplanes, machine guns, etc.

扇 *shan* originally refers to 'door board or (window) casement'. It is used as the classifier for windows and doors.

头 *tou* 'head' classifies large mammals which have a large head or something in the shape like a head. E.g.: cattle, sheep, lion, elephant, pig, bulb of garlic.

尾 *wei* 'tail' only classifies fish which have a wide and flat tail.

盏 *zhan* means 'small cup'. In ancient time, a lamp has a cup-like container to contain oil. Thus, 盏 *zhan* is the classifier for lamps and lights.

株 *zhu* 'tree trunk' is the classifier of trees and other tree-like plants.

(6) Quality

列 *lie* 'row, line' is the specific classifier only for trains and teams which are arranged as lines. Perceptually, 列 *lie* indicates that the line or row is continued and there are no intervals between linked individuals.

排 *pai* 'row, line' is the common classifier for a group of objects arranged in a line or a row. Intervals may occur between the lined objects. For example, 一排树 *yi pai shu* [a line tree] 'a row of trees', 一排房子 *yi pai fang-zi* [a line house] 'a row of houses', 一排士兵 *yi pai shi-bing* [one row soldiers] 'a line of soldiers'.

根 *gen* 'root' is the classifier for long solid objects which are usually cylindrical: log, hair, branch (of tree), grass, match, stick, rope, cord, string, cable, and so on.

枝 (支) *zhi* means 'branch', it classifies short cylindricities which are straight, inflexible and unwinding. E.g.: pen, pencil, cigarette, and chalk. There is not a clear-cut division between the ranges of objects that 根 *gen* and 枝(支) *zhi* apply. Some nouns, such as 烟 *yan* 'cigarette' and 蜡烛 *la-zhu* [wax-candle] 'candle', can be classified by either of them.

股 *gu* means 'thigh' and indicates 'strand; skein' as a classifier. It generally describes the shape of several thin and long fiber-like objects combined into a thicker string. The objects are usually flexible and winding. For instance, 一股绳子/线/头发 *yi gu sheng-zi/xian/tou-fa* [one strand rope /thread /head-hair] 'a strand (skein) of ropes /threads /hair'. Moving water, air, stream, smell, strength, energy, etc. can also be perceptually regarded as a string crawling from its source and may also be classified by 股 *gu*. E.g.: 两股泉水 *liang gu quan-shui* [two GU spring-water] 'two streams of spring water, 一股香味 *yi gu xiang-wei* [one GU fragrant-taste] 'a whiff of fragrance', 一股劲 *yi gu jing* [one GU strength] 'a burst of energy'.

块 *kuai* 'piece' classifies solid objects appearing as lumps or chunks: wood, bread, cake, meat, bone, iron, board, soap, and so on. It can also be the classifier for some objects which are flat but can be folded as a lump. For instance, cloth, and towel.

片 *pian* 'thin piece, slice' classifies objects which are in small and thin pieces. For example, sliced meat, skin, bread and cake, cloud, snow, leaf, cloth, paper and glass which are in small pieces. 块 *kuai* indicates that the classified object is thick and in three-dimensional shape, but 片 *pian* shows that the object is thin and/or small and can be viewed as two-dimensional.

团 *tuan* 'round' is used with round or lumped objects which are also soft and flexible: clay, dough, ground meat, wool, lumped paper. It differs from 块 *kuai* by consistency.

滴 *di* means 'to drip' when it is a verb. As a classifier, it means 'drop' and only classifies liquids which appear in small drops: tear, water, rain, eye drop, and blood.

丸 *wan* 'small ball, pellet' classifies objects which are round, solid and small. Such as pill and bolus.

粒 *li* means 'grain' in classical Chinese and it classifies solid objects which are very small and come in grains. For example, rice (cooked or uncooked), sand, seed, and bullet.

All the three classifiers 滴 *di*, 丸 *wan* and 粒 *li* classify small objects and are distinguished from other classifiers by size. Moreover, they also differ from each other by materials (滴 *di* for liquid or solid vs. 丸 *wan* and 粒 *li* for solid), shape (丸 *wan* for round vs. 粒 *li* for otherwise) and size (粒 *li* for very small vs. 丸 *wan* for otherwise).

颗 *ke* refers to 'small and round things', and it is the specific classifier for head and heart. Moreover, it can also classify small and round objects like peanut, seed, sand and bullet, just as 粒 *li* does.

(7) Quanta

打 *da* is a transliteration of English 'dozen', thus, it usually classifies merchandise that come in dozens.

帮 *bang* 'gang' describes people in groups or bands, and mostly it is a derogatory term.

伙 *huo* 'mess, group, crowd' has the same function of and can be replaced by 帮 *bang*.

群 *qun* 'group, school' classifies people, animals or insects in groups. E.g.: 一群人 *yi qun ren* [one group people] 'a group of people', 一群羊 *yi qun yang* [one group sheep] 'a flock of sheep', 一群鱼 *yi qun yu* [one group fish] 'a school of fish', 一群蚂蚁 *yi qun mayi* [one group ant] 'a nest of ants'.

批 *pi* 'batch, lot, group' classifies goods which are in batches and people who are in sequential groups.

(8) Synonym

本 *ben* had a meaning of 'book' in classical Chinese, and it became the classifier of all kinds of books as textbooks, magazines, dictionaries, novels, and so on.

册 *ce* also means 'book'. As a classifier, it refers to 'volume' or 'copy' which also modifies books.

辆 *liang* originally was the name of a cart or carriage which was drawn by one horse (Li 1965, p. 3751). Later, it became the classifier of wheeled vehicles (except for trains): car, truck, bicycle, motorcycle, carriage, cart, and so on.

篇 *pian* '(finished) article' is the classifier for articles and papers.

句 *ju* 'sentence' is used as the classifier for sentences.

艘 *sou* was one of the word for boat originally. In Modern Chinese, it is only used as a classifier for all kinds of ships and boats.

棵 *ke* 'plant' is the classifier of all plants like trees, grasses, weeds, crops, and vegetables.

朵 *duo* refers to 'flower' originally. In Modern Chinese, it is used as a classifier for flowers and something like a flower, such as clouds.

声 *sheng* 'sound' only classifies nouns which are related to voice or sound. For example, (the sound of) bell, thunder, and (the actions of) calling, shouting, yelling, talking and so on.

(9) Time

顿 *dun* 'pause' is the classifier for meals and some harmful actions like beating, hitting, complaint, refutation, criticizing, and scolding. It is also a measure word for the verbs of these events.

期 *qi* 'period, phase' refers to 'issue' to classify magazines and journals. It also classifies projects with the meaning of 'phase' and classifies training programs: 三期工程 *san qi gong-cheng* [three phase projects] 'three phases of a project', 两期培训班 *liang qi pei-xun ban* [two time train class] 'two classes of the training program'.

(10) Type

番 *fan* 'kind; time' classifies intention and some actions like talk, fight, and quarrel: 一番好意 *yi fan hao-yi* [one kind good-intention] 'good intention', 一番话 *yi fan hua* [one kind talk] 'a talk', 一番打斗 *yi fan da-dou* [one time fight-fight] 'a fight'.

家 *jia* 'family' is the classifier for shops, stores, restaurants and theories: 一家书店 *yi jia shu-dian* [one family book-store] 'a bookstore', 一家学说 *yi jia xue-shuo* [one family study-speech] 'a school of theory'.

类 *lei* 'class, type' classifies objects or concepts which are grouped in some categories, classes or types: 两类人 *liang lei ren* [two kind people] 'two kinds of people', 三类词 *san lei ci* [three class word] 'three categories of words'.

项 *xiang* 'item' classifies abstract things which can be listed, such as policies, principles, plans, explanations, and works (include missions and projects).

样 *yang* 'shape, form, style' classifies objects which are in some styles, shapes, forms or kinds: 三样菜 *san yang cai* [three kind dish] 'three dishes', 两样东西 *liang yang dong-xi* [two kind thing] 'two things (objects)'.

种 *zhong* 'kind, type, class' is a synonym of 类 *lei*, but it is used more frequently than 类 *lei*. In taxonomy, 种 *zhong* sometimes refers to the subcategory of 类 *lei*.

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Zhaohui Cheng was born on April 16, 1966 in Anhui Province, China. She enrolled in Nanjing University in Nanjing, China and received a B.S. degree in Chinese language and literature in 1986. In 1989, she earned her M.A. degree from the Department of Chinese Language and Literature in Nanjing University. From 1989 to 1993, she worked as an assistant lecturer and a lecturer in the Department of International Students in Nanjing Normal University, teaching Chinese language courses and conducting research in the areas of Chinese language pedagogy, Chinese dialects, and Modern Chinese language. In 1994, she entered the University of Florida to pursue a Ph.D. in the Program in Linguistics and worked as a teaching assistant in the Department of African and Asian Languages and Literatures. She is a member of the Chinese Language Teachers Association (CLTA) and the Associations of American Applied Linguistics (AAAL). Zhaohui Cheng earned her Ph.D. degree in May 2000 from the University of Florida.

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

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